

# A REVISION OF THE MICROTROMBIDIINAE (ACARINA, TROMBIDIIDAE) OF AUSTRALIA AND NEW GUINEA

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## Fig. 1-38.

In the Zool. Anz., 1935, 109 (1/2), 107-112, Sig Thor in reviewing the family Trombidiidae, divided it into ten subfamilies, the sixth of which he called the Ottoninae, with the genus *Ottonia* P. Kramer, 1877 (as emended by G. Canestrini, C. P. George and himself) as the type. Later in the same publication (1935, 110, (1/2), 47) he changed the subfamily to Microtrombidiinae with *Microtrombidium* G. Haller, 1882, as type, on the grounds that *Ottonia* was preoccupied by Gistel 1848, in the Crustacea and by von Malm, 1873, in the Vermes.

In the Records of the South Australian Museum 1937, 6, (1), 75-100, the present writer reviewed the then known Australian species of Trombidiidae in the light of Sig Thor's studies.

Since that time much more material has come to hand, including some from New Guinea, and a further revision of the family is needed. In the present paper, however, only the subfamily Microtrombidiinae is dealt with and that only as far as the adults or nymphs are concerned, the larval stages being very little and inadequately known.

The genus *Microtrombidium* Haller was first split by Berlese (Redia, 1912), into *Enemathrombium* and *Microtrombidium* s. str. the latter with two subgenera *Dromcothrombium* and *Microtrombidium*, on the structure of the dorsal setae, *Enemathrombium* being restricted to a heterogeneous lot of species with very variable types of dorsal setae but all of which differed from the simple, more or less pennate type found in *Microtrombidium* and *Dromcothrombium*.

In 1916 A. Krause (Zool. Anz., 47, 97, fig. 1-6) erected from the *Enemathrombium* complex, the genus *Campylotrombium* for those species in which the dorsal setae were of uniform length, clavate, septate and decumbently curved. Sig Thor in 1936 (Zool. Anz. 114, 30) went a stage further and placed Berlese's *M. perligerum*, in which the setae are uniformly short and tree-like with intertwining branches, in a new genus *Dendrotrombidium*. *M. vagabundum* (Berl. 1903) he made the type of *Platytrombidium* n.gen. in which the dorsal setae are short, flat and broad, generally triangular and pointed, and fusiform with fine ciliations. He included here several other species. For *M. pexatum* (Koch, 1837) (= *calycigerum* Berl. 1910) he erected the genus *Camerotrombidium*, in which the larger dorsal setae at least, were erect, globose, septate and chambered, generally short and papilliform. In this genus he included *C. collinum* (Hirst, 1928), *simile* (Hirst, 1928), and *hirsti* (Wom., 1934) all from Australia.

In 1937 Womersley (Rec. S. Aust. Mus., 6, (1), 83) erected the genus *Echinothrombium*, with *O. spinosum* Canest., 1877, as type, for those species in which some or all of the dorsal setae are spine-like with or without short ciliations. Included here were several Australian species. Berlese's *M. (E.) eutrichum* was, in the same paper, made the type of a new genus *Eutrichothrombium* in which the dorsal covering consists of closely packed, globose, non-septate setae, interspersed with longer fine setae. A new genus *Lammothrombium*, with the dorsal setae as uniformly short, pointed, leaf-like laminae with strong mid-rib and marginal ciliations, was made for a new Australian species *L. myrmicum*. Amongst the genera

included by Sig Thor, 1935 (*loc. cit.*) and also by Womersley, 1937, in this subfamily were *Calathrombium* Berl., 1918, and *Neotrombidium* Leonardi, 1901. The first of these, however, has a very different type of crista, which conforms with that figured by Berlese (1912) for the genus *Tanaupodus* Haller, 1882, and *Calathrombium* (type *C. pooli* Berl.) must therefore be assigned to Sig Thor's *Tanaupodinae*.

The genus *Neotrombidium* also differs widely from the *Microtrombidinae* in that the crista is enlarged anteriorly into a more or less triangular area or cusp, in this respect showing homology with that which I have found recently in the nymphs of the genus *Leuvenhoeckia* (*Acomatacarus*). *Neotrombidium* must therefore be removed from the *Microtrombidinae*.

The genus *Mauriquia* with *M. bequaerti* B. & K. as type has recently been erected (1942, Rev. Acad. Columbiana d. Ci. Exact, Bogota, 17, 110-127) by J. Boshell and J. A. Kerr for six species of *Microtrombidinae* from Columbia, South America. In the generic description the features stressed are (1) crista anteriorly rod-like with a subposterior sensillary area, (2) palpal tibia with strong claw, smaller accessory claw, two pectines, and an external spine, and (3) the dorsal setae of varied forms. Now these characters are those found in *Microtrombidium* (Haller, 1882, s.str.), with *pusillum* Hermann, 1804, as type, except that while generally present, the external spine of the palpal tibia is absent in *pusillum* and one or two other species; this, however, hardly justifies a generic separation.

In the same paper Boshell and Kerr also describe a number of species of *Microtrombidium* s.l., which in the varied and different forms of dorsal setae, fit into several of the genera into which *Microtrombidium* s.l. in the present paper is divided. Even the species included in *Mauriquia* by the authors, belong to several of these genera, including *Microtrombidium* s.str.

In *Microtrombidium* s.str. should be placed *Mauriquia vocae* B. & K., *sampsoni* B. & K., and ? *bolivarensis* B. & K., and also *Microtrombidium wilsoni* B. & K., and *kompi* B. & K. In the genus *Echinothrombium* should be included *Mauriquia bequaerti* B. & K., *Microtrombidium duartei* B. & K., and *bugheri* B. & K.

*Microtrombidium urborcalis* B. & K. and *acuna* B. & K. would seem to belong to *Camerotrombidium* while *Microtrombidium sopari* B. & K. would be a *Foliotrombidium*, and *caracensis* possibly a *Hiotrombidium*. *Mauriquia vestrepoi* B. & K. and *mauriquia* B. & K. may be placed in *Holcotrombidium*.

Boshell and Kerr in their paper also describe the larvae reared from eggs laid by a captured adult *Mauriquia bequaerti*. From the description and figure given the larva comes close to those described by Oudemans (1912) as belonging to the genus *Parathrombium* Bruyant, 1910. It is also somewhat similar, except that the chelicerae are free and not enclosed in a chitinous dentate ring and that the claws of the third leg are normal, not deformed, to the larvae of *Camerotrombidium simile* (Hirst) described in the present paper.

The present paper is the first of a series in which it is intended to critically review the adult species of Trombidiidae of Australia and New Guinea. The latter area is included, as amongst new material available there are a number of species, collected in that area by Maj. G. M. Kohls of the American Scrub-typhus Commission, which can be referred to some of those described, very inadequately, by Canestrini in 1889.

In the *Microtrombidinae* as restricted herein, it is shown that, following the work of Berlese and Sig Thor, good generic characters are to be found in the types of dorsal setae; the form of the crista and of the palpal tibia being of subfamily value. Specific characters are to be found in the dimensions of the front tarsi and metatarsi and in the lengths and degrees of ciliation of the dorsal setae, etc.

A key to the genera considered as falling into this subfamily is given



## FAMILY TROMBIDIIDAE Leach 1814.

## SUBFAMILY MICROTROMBIDIINAE Sig Thor, 1935 (Jan.).

= OTTONIINAE Sig Thor, 1934, Nov. (1935).

## Emended Description.

Body size small to moderate. Shape more or less cordate, often with well defined shoulders to hysterosoma, propodosoma usually triangular, its base slightly narrower than hysterosoma, latter slightly tapering with rounded posterior. A distinct suture line between propodosoma and hysterosoma. Crista linear, without any enlarged triangular or subtriangular anterior area or nasus<sup>1</sup>, with a roundish subposterior areola-like sensillary area furnished with a pair of long filamentous sensillae. Eyes usually present, 2+2, on well developed sessile or subsessile ocular shields. Palpi generally stout, tibia with stout apical claw, smaller accessory claw, two pectines and usually 1 or more strong spines on external side; tarsus usually elongate. Dorsal setae very variable, simple, or spine-like, pennate, clavate, septate or of curious forms, often of two distinct sizes or forms.

Genotype: *Microtrombidium* G. Haller, 1882.

## KEY TO THE GENERA (ADULT) OF THE MICROTROMBIDIINAE SIG THOR 1935.

1. Legs I and IV very much longer than the body, I much stouter than the others. Shoulders prominent. Eyes 2+2, sessile. Palpal tibia fairly slender in distal portion, with strong apical claw, with or without smaller accessory claw, with pectines but without external spines. Dorsal setae, more or less pennate or with long setules, of uniform or variable length. *Dromothrombidium* Berl. 1912.
- Legs I and IV not, or only slightly longer than the body . . . . . 2.
2. With two kinds of dorsal setae, of which the longer are stiff and spine-like, with or without short setules or serrations . . . . . 3.
- If with two kinds or lengths of dorsal setae then the longer ones are not stiff and spine-like . . . . . 4.
3. The smaller dorsal setae pennate, or stiff with long ciliations. Palpal tibia with one strong external spine . . . . . *Echinothrombidium* Wom. 1937.
- Smaller dorsal setae spatulate, with long ciliations or short denticles. Crista posterior of sensillary area evanescent. Palpal tibia without external spine . . . . . *Spathulathrombidium* nov.
4. Dorsal setae, even if of two different lengths, pennate, or as slender rods with long ciliations . . . . . *Microtrombidium* Haller 1882 s. str.
- Dorsal setae of varying forms but not as above . . . . . 5.
5. At least the larger dorsal setae septate and chambered . . . . . 6.
- No dorsal setae septate . . . . . 7.
6. Dorsal setae uniform, slender, clavate, septate, and decumbently curved . . . . . *Campylotrombidium* Krauze 1916.
- Larger dorsal setae globose or thistle-like, septate, upright and not curved or decumbent; smaller setae variable . . . . . *Camerotrombidium* Sig Thor 1936.
7. Dorsal setae mainly globose and tightly packed, but with some fine simple longer setae interspersed . . . . . *Eutrichothrombidium* Wom. 1937.
- Dorsal setae otherwise . . . . . 8.
8. Dorsal setae small, uniform, tree-like with fine intermingling branches. Palpal tibia with external spine . . . . . *Dendrotrombidium* Sig Thor 1936.
- Dorsal setae otherwise . . . . . 9.
9. Dorsal setae thin and lamellate, or scale-like, often with the margins incurved, sometimes so much so as to form a sort of helmet . . . . . 10.
- Dorsal setae otherwise . . . . . 12.
10. Dorsal setae with the margins not incurved, foliate . . . . . 11.
- Dorsal setae with the margins more or less incurved, sometimes strongly so, the setae being helmet-like . . . . . *Holcotrombidium* nov.

<sup>1</sup> The anterior rounded or sinuated apex of the propodosoma may be a more or less lightly chitinated transverse plate appearing as part of the crista as in *R. echidnium* but there is no true anteriorly projecting nasus.

11. Dorsal setae thin, pointed, leaf-like with strong mid-rib and marginal ciliations  
*Laminothrombium* Wom. 1937  
 Dorsal setae thin, blunt and rounded at apex, more or less scale-like *Foliotrombidium* nov.
12. Some or all the dorsal setae bifid, either from the base or apically .. .. 13.  
 Dorsal setae simple, solid, blunt or pointed apically .. .. 14.
13. Dorsal setae thick stemmed with long ciliations and frequently bifid near apex, the branches appearing clavate .. .. *Georgia* Hull 1918.  
 Dorsal setae bifid from the base, the two branches forming more or less concave opposed lips  
*Hiotrombidium* nov.
14. Dorsal setae, sometimes only the smaller, fusiform, apically acute with short ciliations .. 15.  
 Dorsal setae otherwise, blunt or only obtusely pointed at apex  
*Enemothrombium* Berl. 1912 s. str.
15. Median segments of legs I and IV produced laterally at apex into strong irregularly dentate processes. Coxae IV set at right angles to III, so that legs IV are splayed outwards  
*Pedotrombidium* nov.  
 Legs normal, dorsal setae fusiform and pointed with short ciliations  
*Platytrombidium* Sig Thor 1936.

### Genus DROMEOTHROMBIUM Berl. 1912.

Redia 8, (1), 132, fig. 59.

Berlese erected *Dromeothrombium* as a subgenus of *Microtrombidium* for his species *M. macropodum* from Java, on the character of the first and fourth legs being very much longer than the body.

In 1937 (Rec. S. Aust. Mus., 6, (1), 86) I placed Banks's *Rhyncholophus attolus* from New South Wales, (and earlier (Womersley, 1934) as *Microtrombidium*) in *Dromeothrombium*; in 1939 (Tr. Roy. Soc. S. Aust., 63 (2), 150) I recorded *D. macropodum* from Queensland, and described *D. dromus* from South Australia.

Upon re-examination of this material I now find that, while agreeing in the long first and fourth legs with the genotype, *macropodum*, the species *attolus* and *dromus* are generically distinct in that the crista has a small but distinct subtriangular anterior area or nasus, that the accessory claw of the palpal tibia is wanting, but that there are instead 2-3 stout spines, and that there are no pectines on this segment of the palpi.

These two species must then be withdrawn, not only from the genus but also from the subfamily Microtrombidiinae and will later be referred to a new genus and family. The Queensland specimens are now recognized as distinct from *macropodum* and renamed *queenslandiae*.

The genus can be defined as follows:

Legs much stouter than the rest, I and IV longer than the body. Shoulders very prominent. Eyes 2+2, sessile, on ocular shields. Crista linear, with subposterior sensillary area and paired sensillae, anterior area absent, no nasus. Palpi relatively stout, tibia with strong apical claw, accessory claw, and two pectines but in known species without external spine.

Genotype *D. macropodum* Berl., 1912. Also *D. queenslandiae* nov. nom. for *macropodum* Wom., 1939, nec Berl.

### DROMEOTHROMBIUM QUEENSLANDIAE nom. nov.

=*D. macropodum* Wom., 1939, nec. Berl.

Fig. 1 A-D.

Redescription. Colour in life probably white. Shape cordiform with prominent shoulders. Length 0.9 mm., width across shoulders 0.72 mm. Legs relatively thick, especially I; length of leg I 1575 $\mu$ , II 1020 $\mu$ , III 1020 $\mu$ , IV 1875 $\mu$ ; tarsus I elliptical, 375 $\mu$  long by 190 $\mu$  high, metatarsus I 225 $\mu$  long. Crista linear, 396 $\mu$

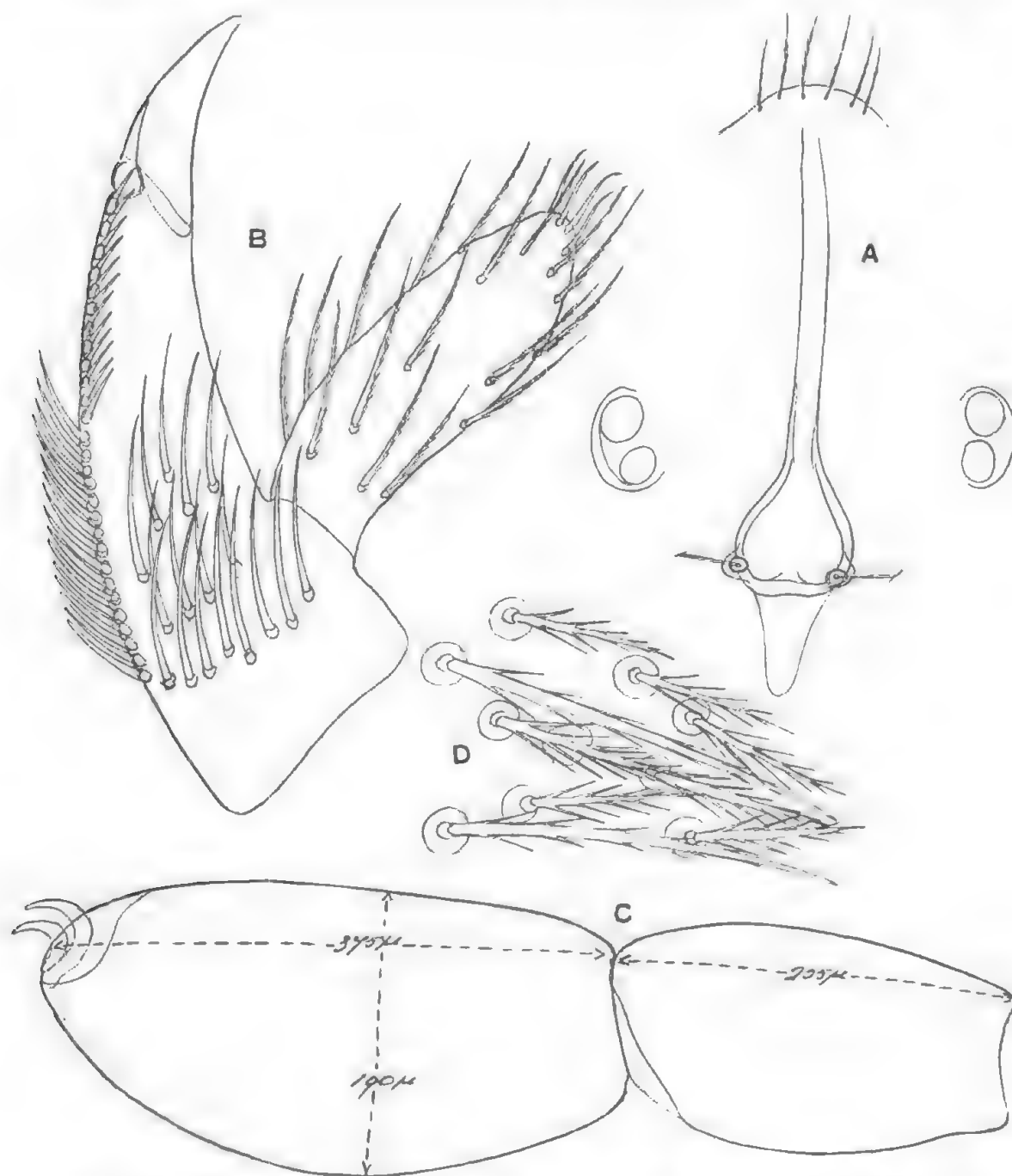


Fig. 1. *Dromeothrombium queenslandiae* sp. n. A, Crista and eyes ( $\times 200$ ); B, palpal tibia and tarsus ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 200$ ); D, dorsal setae ( $\times 860$ ).

long, with subposterior sensillary area with sensillae apparently nude and ca.  $126\mu$  long, their bases  $54\mu$  apart. Palpi as figured (I B), tibia as in subfamily with strong apical claw, smaller accessory claw, two well defined pectines but no external spines; tarsus elongate and reaching tip of claw. Dorsal setae as in fig. 1 D, with strong setules and of two different lengths,  $25-30\mu$  and  $64\mu$ , the longer setae being fewer in number and with rather shorter setules.

*Loc.* Only known from the original two adults, collected in Queensland in 1939 by Dr. W. G. Heaslip, one from Cairns in March, the other from Innisfail in December.

*Remarks.* The genotype *D. macropodum* Berl., 1903 (Redia, 2, 153, pl. 15, fig. 3; Redia, 1912, 8, 132-3, text fig. 59) was from Java. Berlese only figured

the entire dorsal surface and an enlarged dorsal seta. Vitzthum (Trenbina, 1926, 8, 136-7, fig. 80 and 81) described an adult from Buitenzorg and gave figures and detailed measurements of the palpal tibia and front tarsus and metatarsus.

The present species differs from the genotype in (1) the presence of a distinct accessory palpal claw, (2) the much greater height of the front tarsus as compared with the length, and (3) the different form of the dorsal setae, which are of two sizes, 25-30 $\mu$  and to 64 $\mu$  as compared with uniform, 20-30 $\mu$  long in *macropodum*.

### Genus ECHINOTHROMBIDUM Womersley, 1937.

Rec. S. Aust. Mus. 6 (1), 89.

*Mauniquia* Boshell and Kerr, 1942 (in part), Rev. Acad. Columb. Ci. Ex., 5, 110-127.

*Microtrombidium* Boshell and Kerr *ibid.* (in part).

This genus was raised in 1937 for those species of *Microtrombidium* s.l. in which the longer of the dorsal setae are stiff and spine-like with or without short ciliations or serrations. The type designated was *Ottonia spinosa* Canestrini, 1877, and other species were *M. echidninum* Hirst, 1931 (= *victoriense* Wom., 1934), *M. spinatum* Wom., 1934, *M. hystriinum* Canest., 1889, *M. diversipile* Canest., 1889, *M. southcotti* Wom., 1934, and *M. willungae* Hirst, 1931.

Of these species, *southcotti* has the smaller dorsal setae spathulate with fine ciliations, all the other species having these smaller setae of the pennate type or stiff with long ciliations. Other species with the spathulate type of microsetae are herewith described, and together with *southcotti* separated off as a new genus *Spathulathrombium*.

The genus *Echinothrombium* may be diagnosed as follows:

As in *Microtrombidium* but with two kinds and lengths of dorsal setae, one short and pennate, or stiff with rather long ciliations; the other long, stiff and spine-like with acute apex and with short ciliations, indistinct serrations or quite smooth. Eyes 2+2, on ocular shields. Apex of propodosoma sinuate, frequently in well chitinized specimens with a transverse ill-defined plate adjoining tip of crista. Crista linear with subposterior sensillary area with paired filamentous sensillae. Palpi stout, tibia as in subfamily, with a single spine on external surface. Body shape elliptical with only moderately pronounced shoulders. Legs I and IV not or not much longer than body.

### ECHINOTHROMBIDUM ECHIDNINUM (Hirst, 1931).

*Microtrombidium echidninum* Hirst, 1931, P.Z.S., 561; Womersley, 1937, Rec. S. Aust. Mus., 6 (1), 90.

*M. (Enemathrombium) victoriense* Womersley, 1934, Rec. S. Aust. Mus., 5 (2), 195.

*Echinothrombium echidninum*, Womersley, 1937, Rec. S. Aust. Mus., 6 (1), 90.

### Fig. 2 A-E.

Redescription. Colour in life uniformly red. Body oval, broadest across the shoulders. Length 2.6 to 3.0 mm., width 1.2 to 1.5 mm. Legs I 2250 $\mu$  long, II 1725 $\mu$ , III 1650 $\mu$ , IV 2500; tarsus I 270 $\mu$  high by 630 $\mu$  long, metatarsus I 465 $\mu$  long, for specimen of 3.0 mm. in length. Eyes 2+2, sessile. Crista as figured, 645 $\mu$  long with sensillary area at about  $\frac{3}{8}$  from anterior end; sensillar bases 61 $\mu$  apart with sensillae ca. 150 $\mu$  long and apparently nude. Mandibles with inner margin of chelicerae finely serrate. Palpi as in generic diagnosis, tarsus not

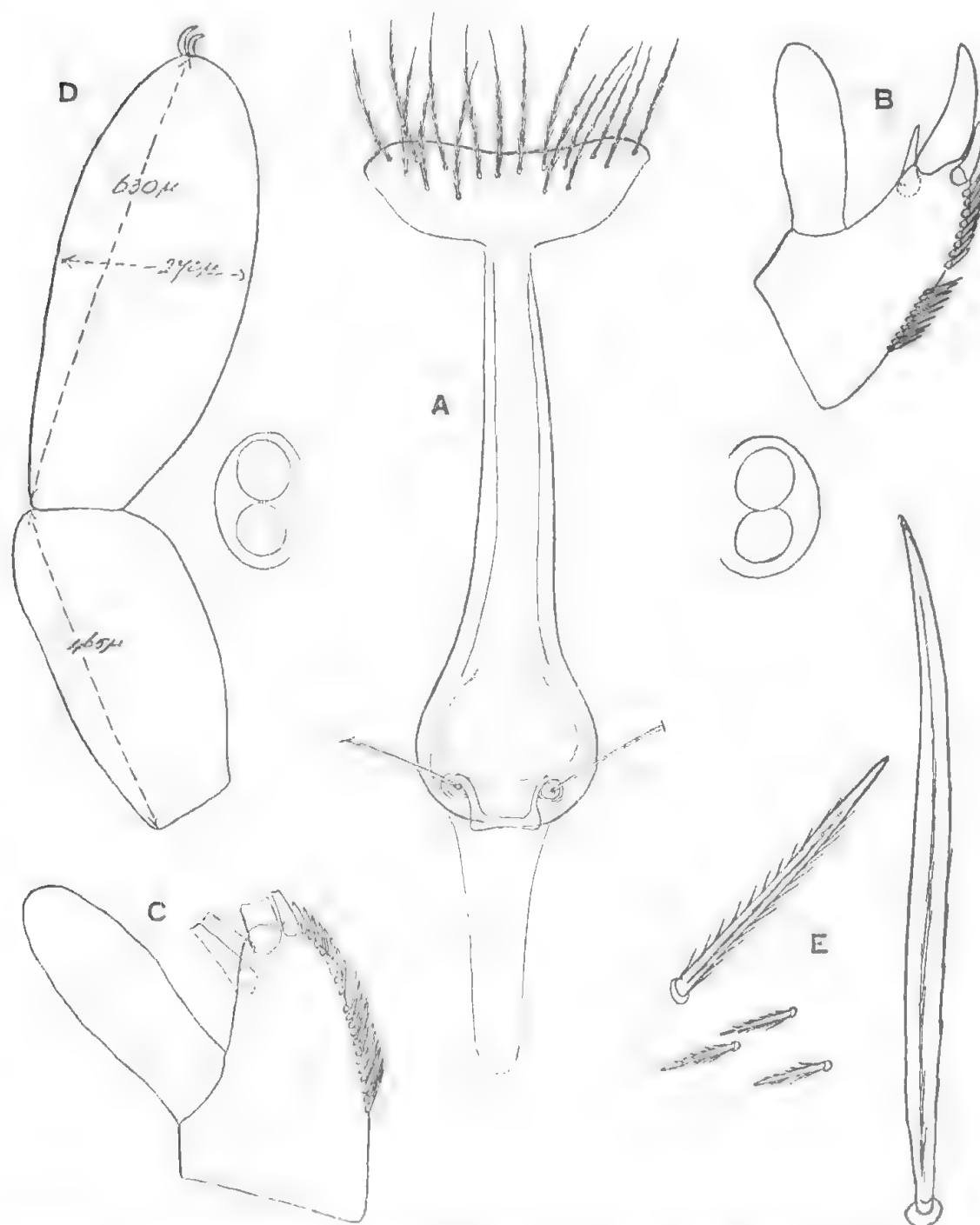


Fig. 2. *Echinotrombium echidninum* (Hirst). A, Crista and eyes ( $\times 200$ ); B, palpal tibia and tarsus ( $\times 200$ ); C, same of Hirst's type ( $\times 200$ ); D, front tarsus and metatarsus ( $\times 87$ ); E, dorsal setae ( $\times 860$ ).

reaching tip of tibial claw. In Hirst's type, as he states, there are two strong external spines on the palpal tibia, but only one in all my specimens (cf. fig. 2 B and C). Smaller dorsal setae pointed, 18-29 μ long, and with short setules; longer setae to 220 μ in length, many of which appear nude but in reality have rows of short adpressed setules as in fig. 2 E; between these extremes are some setae of intermediate length, ca. 108 μ, on which there are distinct setules.

*Loc.* Hirst's type specimen, in the S. Aust. Mus. was from Mt. Gambier, S. Aust. I have additional material from South Australia: Flinders Chase, Kangaroo Is., Dec., 1934; Victoria: Sassafras 1931, Olinda 1940.



## ECHINOTHROMBIDIUM WILLUNGAE (Hirst, 1931).

*Microtrombidium willungae* Hirst, 1931. P.Z.S., (1), 562.

*Microtrombidium spinatum* Womersley, 1934. Rec. S. Aust. Mus., 5 (2), 192.

*Echinothrombium spinatum* Womersley, 1937. Rec. S. Aust. Mus., 6 (1), 89.

*Echinothrombium willungae*, Womersley, 1937, *ibid.*, 89.

Fig. 3 A-E.

In the original description of *spinatum* the dorsal setae were stated to be all of the one type. They are, however, of two very different lengths, although much of the same type. A careful comparison of the type with the description

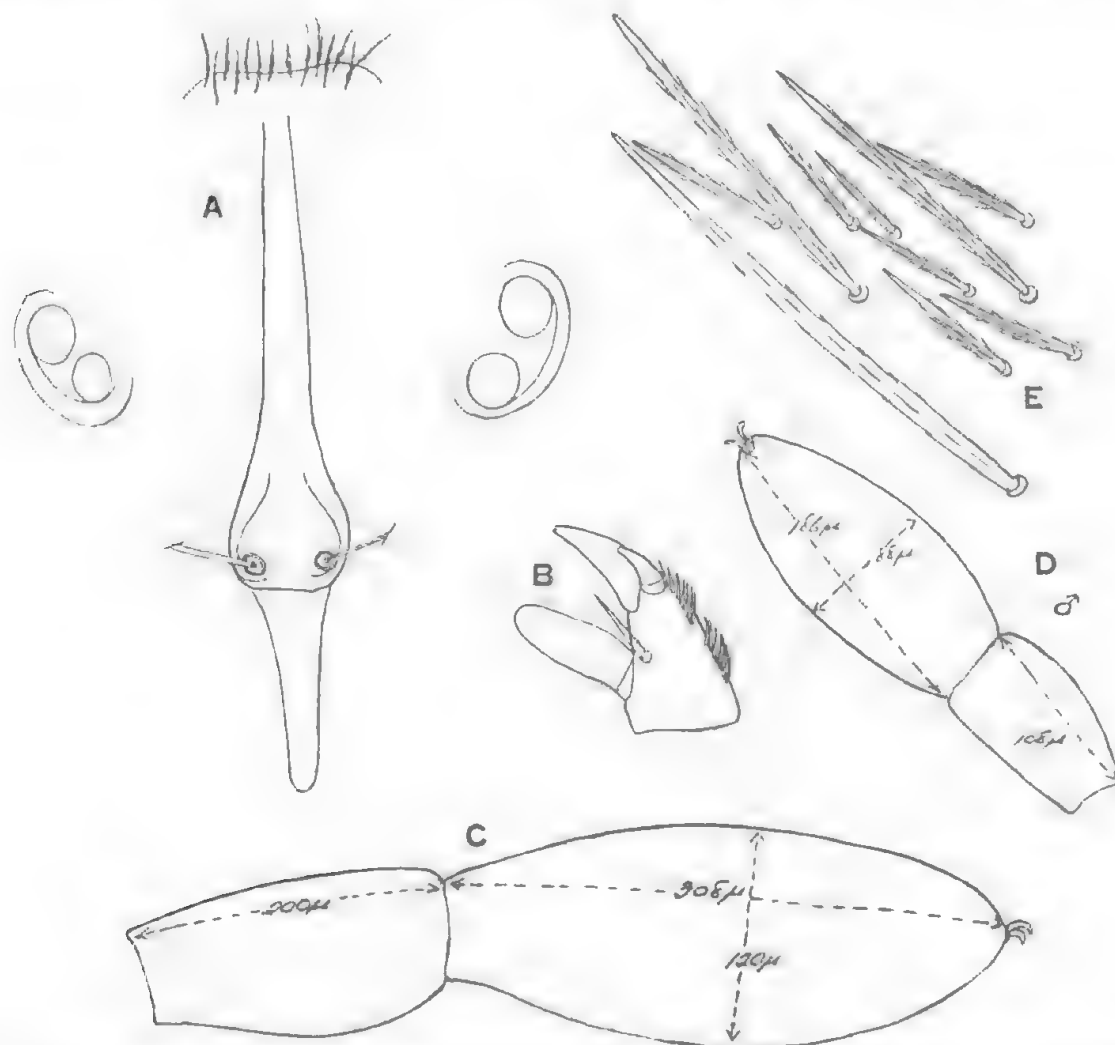


Fig. 3. *Echinothrombium willungae* (Hirst). A, Crista and eyes ( $\times 200$ ); B, palpal tibia and tarsus ( $\times 200$ ); C, front tarsus and metatarsus ♀ ( $\times 200$ ); D, same of ♂ ( $\times 200$ ); E, dorsal setae ( $\times 860$ ).

of Hirst's *willungae* and with specimens of the latter from many South Australian localities shows that *spinatum* is co-specific with *willungae* and must therefore sink as synonymous with it.

This species is, as stated by Hirst, closely related to *echidninum* from which it differs in the dimensions of the front tarsi and metatarsi and in the different dorsal setae. In *willungae* the smaller dorsal setae are longer than in *echidninum*.

of rather different form and do not constitute the major portion of the dorsal clothing. The larger setae do not reach the lengths of those found in *echidnium* and they are all distinctly ciliated or setulate. Intermediate sizes also occur.

The following redescription is drawn from a specimen from Rivervale, South Australia. In the dimensions of the front tarsi and metatarsi the extremes and average of nine specimens are given:

Redescription. Length to 2.1 mm., width across shoulders to 1.275 mm. Shape as in *echidnium*. Legs shorter than body, I 1275 $\mu$ , II 930 $\mu$ , III 945 $\mu$ , IV 1125 $\mu$ ; tarsi I 292-315 $\mu$  (aver. 308 $\mu$ ) long, 101-130 $\mu$  (aver. 120 $\mu$ ) wide, metatarsi I 182-210 $\mu$  (aver. 201 $\mu$ ) long. Eyes 2 + 2, sessile, well away from crista and in advance of sensillary area. Crista as figured, 480 $\mu$  long, with sensillary area at about  $\frac{2}{3}$  from apex, sensillae ca. 120 $\mu$  long, apparently nude and with bases 34 $\mu$  apart. Chelae with inner edge serrate. Palpi as figured, tarsus elongate but not over-reaching tip of palpal claw, tibia with one long slender external spine well separated from base of claw.

Dorsum thickly covered with spine-like setae; generally of two distinct lengths, but with some intermediate; all with distinct ciliations or setulations except at the tips which are pointed and more chitinized; short setae 35-45 $\mu$  long, longer setae to 150 $\mu$  long.

Loc. Hirst's type was from Willunga, South Australia, Oct. 1929. I have further specimens from the following South Australian localities: Glen Osmond, Oct. 1933, Long Gully, May 1934, Mt. Osmond and Mt. Lofty, June 1934, Burnside, Aug. 1934, Rivervale, April 1934, Belair, May 1935 and March 1938.

All the above specimens in possessing three pairs of genital discs are adult and probably all females. Two other specimens, one from Mt. Lofty, S. Aust., June 1934, and one from Fern Tree Gully, Victoria, Jan. 1937 agree in the nature of the dorsal setae but are considerably smaller in size and dimensions of front tarsi and metatarsi and crista, etc., as follows:

From Mt. Lofty.

Length 675 $\mu$ , width 420 $\mu$ . Legs I 675 $\mu$ , II 470 $\mu$ , III 440 $\mu$ , IV 675 $\mu$ ; tarsus I 186 $\mu$  by 86 $\mu$ , metatarsus I 105 $\mu$ . Crista 195 $\mu$  long. Sensillae ca. 130 $\mu$  long and bases 23 $\mu$  apart. Dorsal setae 30-40 $\mu$  and to 100 $\mu$ .

From Fern Tree Gully:

Length 675 $\mu$ , width 450 $\mu$ . Legs I 660 $\mu$ , II 420 $\mu$  ca., III 450 $\mu$ , IV 600 $\mu$ ; tarsus I 189 $\mu$  by 90 $\mu$ , metatarsus I 110 $\mu$ . Crista 190 $\mu$  long. Sensillae ca. 126 $\mu$  long and bases 25 $\mu$  apart. Dorsal setae 30-40 $\mu$  and to 110 $\mu$ .

Despite the differences in the relative proportions of the tarsal dimensions, which might only be sexual, these specimens must, I believe, be regarded as males. In having three pairs of genital discs they are adults.

#### *ECTHINOTROMBIDIUM BARDONENSE* sp. nov.

Fig. 4 A-D.

Description. Colour red. Shape roughly elliptical with moderately prominent shoulders. Length to 2.025 mm., width to 1.275 mm. Legs fairly stout, I 2100 $\mu$  long, II 1350 $\mu$ , III 1275 $\mu$ , IV 2250 $\mu$ ; tarsi I elliptical 450 $\mu$  long by 210 $\mu$  high, metatarsi I 330 $\mu$  long. Crista linear as figured, 380 $\mu$  long, with subposterior sensillary area, sensillae ? length, bases 36 $\mu$  apart. Eyes 2 + 2, on distinct subsessile ocular shields. Palpi as figured, tibia with one slender external spine, tarsus rather elliptical, reaching tip of tibial claw. Dorsal setae of two kinds and lengths, the smaller pointed, rod-like, 40-55 $\mu$  long, with distinct ciliations; the larger spine-like, to 240 $\mu$  long, with strongly chitinized and pigmented pointed tips, apparently quite nude.

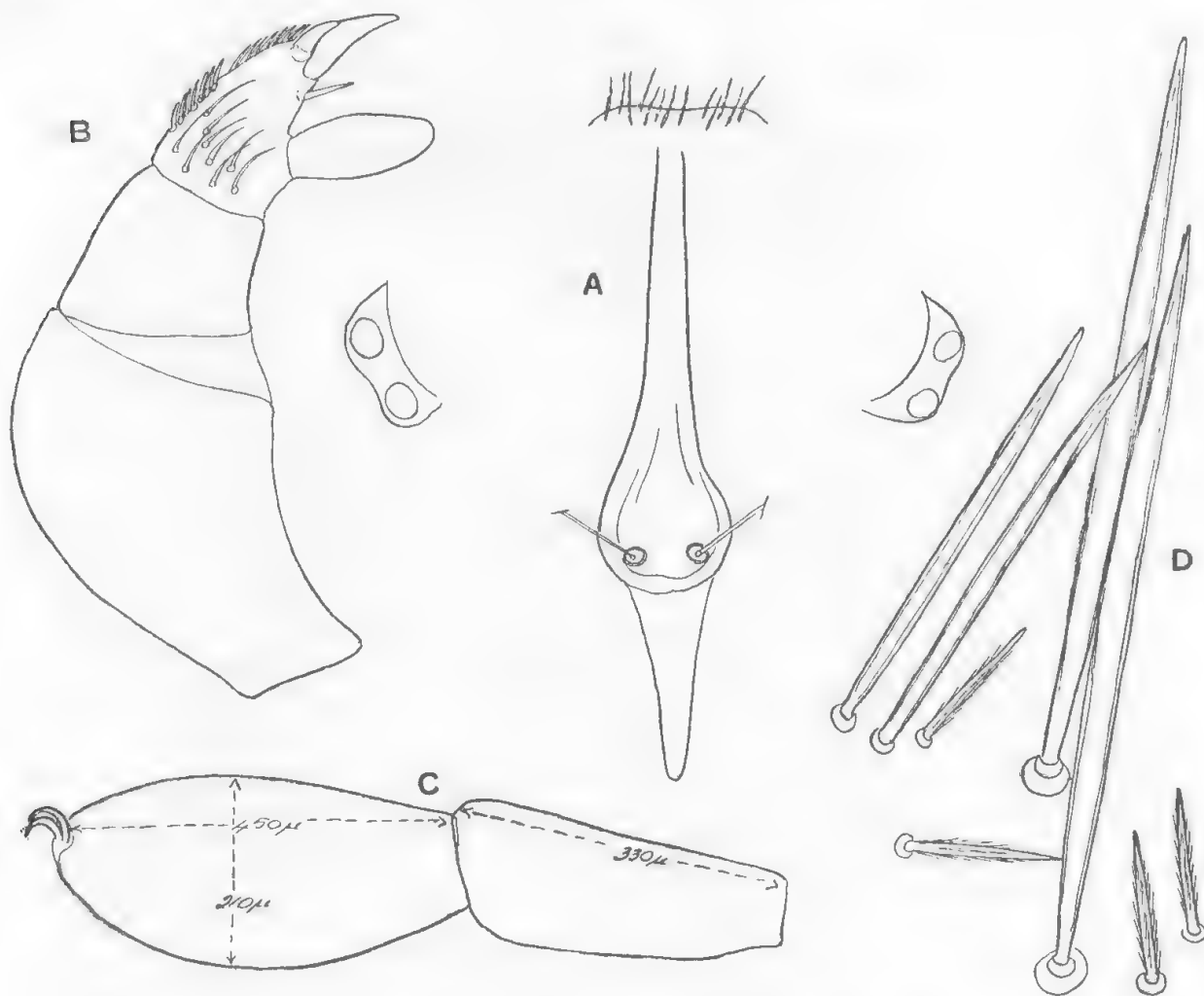


Fig. 4. *Echinothrombium bardonense* sp. n. A, Crista and eyes ( $\times 200$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 87$ ); D, dorsal setae ( $\times 860$ ).

*Loc.* Two specimens from Bardon, Queensland, Aug. 1943 (N.B.T.).

*Remarks.* Close to *echidninum* and *willingae* but differing in the dorsal setae and the proportions of the front tarsi and metatarsi.

*ECHINOTHROMBIVM LAMINGTONENSIS* sp. nov.

Fig. 5 A-D.

*Description.* Adult. Colour red. Shape elliptical, rather broader across shoulders. Length 1.8 mm., width 1.25 mm. Legs not longer than body, I 1725 $\mu$ , II 1080 $\mu$ , III 1080 $\mu$ , IV 1500 $\mu$  tarsus I as figured, 405 $\mu$  long by 135 $\mu$  high, metatarsus I 315 $\mu$  long. Crista as figured 380 $\mu$  long with broad sensillary area at about  $\frac{2}{3}$  from apex, sensillae approximately 200 $\mu$  long, apparently nude and with their bases 32 $\mu$  apart. Eyes 2+2, sessile, on distinct ocular shields and in advance of sensillary area. Mandibles with inner edge of chelicerae finely serrated. Palpi as figured, tibia with one long, pointed, external spine; tarsus elongate, not or only indistinctly clavate and not over-reaching tip of claw.

*Loc.* A single specimen from the Lamington National Park, Queensland. Sept. 1941 (A.R.B.).

*Remarks.* Close to the two preceding species but distinct in the form of the smaller dorsal setae and the dimensions of the front tarsi and metatarsi.

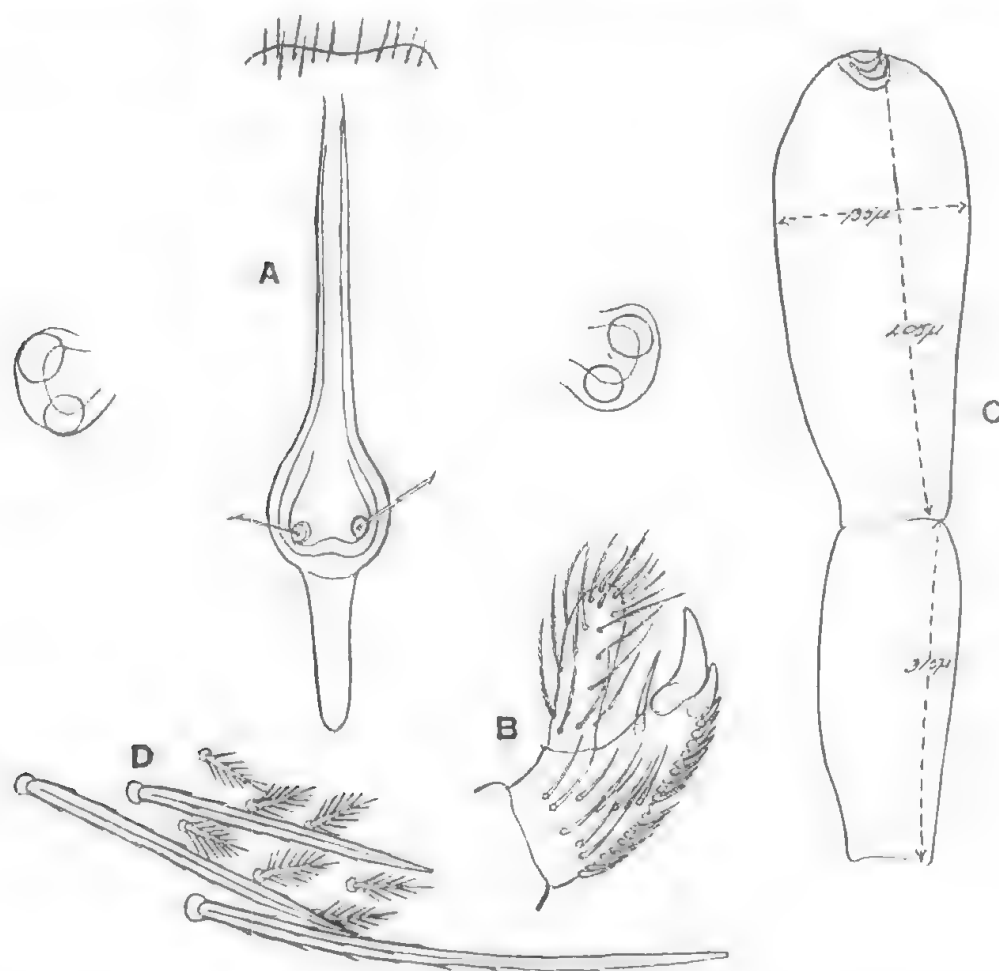


Fig. 5. *Echinothrombium lamingtonensis* sp. n. A, Crista and eyes ( $\times 200$ ); B, palpal tibia and tarsus ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 125$ ); D, dorsal setae ( $\times 860$ ).

KEY TO THE AUSTRALIAN SPECIES OF *Echinothrombium* (ADULTS).

1. Dorsal microsetae pennate with long outstanding setules, 18–40μ long; macrosetae spine-like with sparse short setules, 180–220μ long.  $T_1$  elongate, 405μ by 135μ,  $M_1$  315μ. *lamingtonensis* sp. nov.
- Dorsal microsetae not pennate, more or less rod-like and with only short adpressed setules 2.
2. Microsetae of dorsum much less than one-third length of macrosetae .. 3.
- Microsetae about one-third length of macrosetae, 25–45μ as compared with 150μ, Macrosetae with short setules.  $T_1$  300μ by 120μ.  $M_1$  195μ (adult ♀) .. *willungae* (Hirst).
3. Macrosetae quite nude, to 240μ long; microsetae 40–50μ.  $T_1$  450μ by 210μ.  $M_1$  330μ *bardonense* sp. nov.
- Macrosetae with sparse but distinct setules, to 220μ long; microsetae 20–30μ long.  $T_1$  630μ by 270μ.  $M_1$  460μ .. *echidninum* (Hirst.).

Genus SPATHULATHROMBIUM nov.

As in *Echinothrombium* with the larger dorsal setae long and spine-like, but the smaller setae spathulate with ciliations or setules. The posterior arm of the crista very evanescent, almost invisible, so that the sensillary area appears to be posterior. In all known species the palpal tibia without any external spine, distal portion of tibia slender, about twice as long as basal part.

Genotype: *M. southcotti* Wom., 1934.

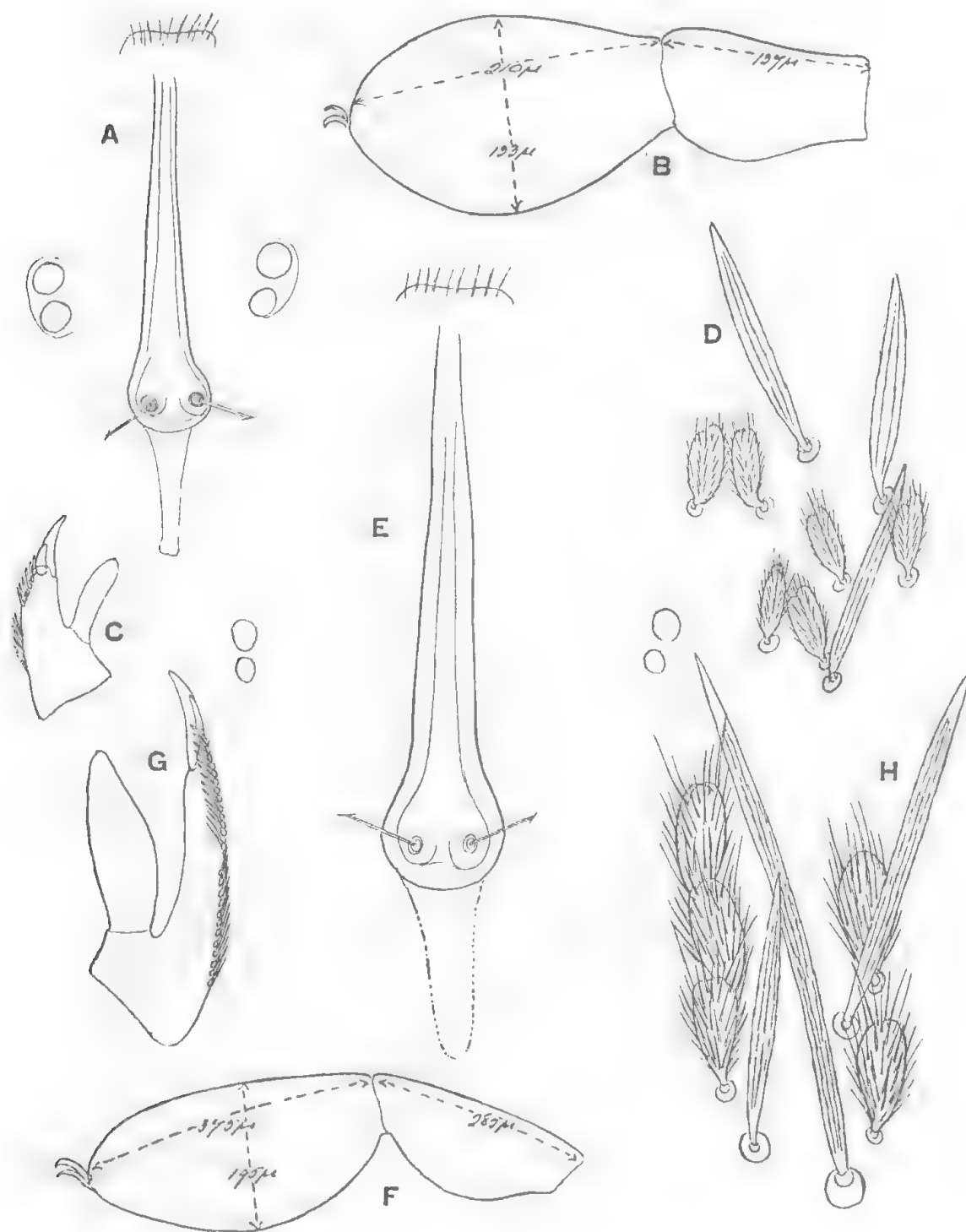


Fig. 6. A-D. *Spathulathrombium southcotti* (Wom.): A, Crista and eyes ( $\times 200$ ); B, front tarsus and metatarsus ( $\times 200$ ); C, palpal tibia and tarsus ( $\times 200$ ); D, dorsal setae ( $\times 375$ ). E-H. *Spathulathrombium maximum* sp. n. E, Crista and eyes ( $\times 200$ ); F, front tarsus and metatarsus ( $\times 87$ ); G, palpal tibia and tarsus ( $\times 200$ ); H, dorsal setae ( $\times 375$ ).



## SPATHULATHROMBIUM SOUTHCOTTI (Wom., 1934).

*Microtrombidium southcotti* Wom., 1934. Rec. S. Aust. Mus., 5 (2), 197.

*Echinotrombidium southcotti* (Wom., 1937). Rec. S. Aust. Mus., 6 (1), 90.

## Fig. 6 A-D.

Redescription. Adult. Shape somewhat elliptical, broadest across shoulders. Colour red. Length to 1.5 mm., width to 0.825 mm. Legs all shorter than body, I 900 $\mu$ , II 675 $\mu$ , III 750 $\mu$ , IV 900 $\mu$ ; tarsus I 218 $\mu$  long by 108 $\mu$  high, metatarsus I 135 $\mu$  long. Crista linear, elongate, 338 $\mu$ , with subposterior sensillary area at about  $\frac{2}{3}$  from apex, sensillae ca. 100 $\mu$  long, and apparently nude, their bases 30 $\mu$  apart. Mandibles with finely serrate inner edge to chelae. Palpi as in the genus, tibia without external spine, tarsus elongate but not reaching tip of claw. Eyes 2+2, ocular shields ill-defined, and slightly in advance of sensillary area. Dorsal setae of two kinds and lengths as in the genus; the shorter setae spathulate, to 26 $\mu$  long by 8 $\mu$  wide, slightly indented at apex and furnished with long ciliations which are slightly longer apically; longer setae spine-like, 75 $\mu$  long by 6.5 $\mu$  wide, tapering apically and with longitudinal rows of indistinct serrations.

*Loc.* A single specimen (type) from Belair, South Australia, Jan. 1943. (R.V.S.).

## SPATHULATHROMBIUM MAXIMUM sp. nov.

## Fig. 6 H-E.

Description. Adult. Shape as in genotype. Colour red. Length to 3.0 mm., width to 2.1 mm. across the moderately pronounced shoulders. Legs not or only slightly longer than body, I 2100 $\mu$ , II 1445 $\mu$ , III 1500 $\mu$ , IV 2500 $\mu$ , tarsus I 405-480 $\mu$  long by 150-180 $\mu$  high, metatarsus I 300-360 $\mu$  long. Crista elongate and fairly thick, 470 $\mu$  long, with subposterior sensillary area at about  $\frac{2}{3}$  from apex, with paired apparently nude sensillae, ca. 200 $\mu$  long and their bases 50 $\mu$  apart. Eyes 2+2 well in advance of sensillary area. Chelicerae with finely serrate inner edge. Palpi as figured the distal portion of tibia very slender (cf. fig. 6 G), tarsus elongate, barely reaching tip of tibial claw. Dorsal setae as in fig. 6 H, of two kinds and sizes, the smaller ones spathulate with long ciliations, to 36 $\mu$  long by 14 $\mu$  wide, and slightly incised apically; longer setae spine-like, 70 to 165 $\mu$  long by 6.5 $\mu$  wide, with a strong apical point, and longitudinal rows of indistinct minute serrations.

*Loc.* Type a single specimen from Greenborough, Vic., 22 Aug., 1934 (A. Tubb); another from Mt. Wellington, Tas., Sept. 1935 (J. W. Evans).

Remarks. Very much larger than *southcotti* in which it agrees in the form but not size of the smaller setae. It differs, however, in the dimensions of the front tarsi and metatarsi.

## SPATHULATHROMBIUM QUEENSLANDIAE sp. nov.

## Fig. 7 A-D.

Description. Adult. Colour red. Shape as in preceding species. Length 1.6 mm., width 1.2 mm., with only moderately prominent shoulders. Legs relatively short, I 715 $\mu$ , II 475 $\mu$ , III 529 $\mu$ , IV 765 $\mu$ ; tarsus I 175 $\mu$  long by 108 $\mu$  wide, metatarsus I 119 $\mu$  long. Crista elongate and moderately thick, 260 $\mu$  long with subposterior sensillary area, posterior arm evanescent, sensillae ca. 150 $\mu$  long, nude, with bases 21 $\mu$  apart. Eyes 2+2, apparently not on ocular shields, and only slightly in advance of sensillary area. Palpi as figured, distal portion of tibia fairly slender, tarsus elongate only reaching to base of claw. Dorsal setae of two

kinds and sizes, the smaller spatulate or battledore shaped,  $32\mu$  long by  $8\mu$  wide, with short denticles; the larger slender, slightly curved and spine-like, fairly uniform in length to  $70\mu$  and with distinct short setules or denticles.

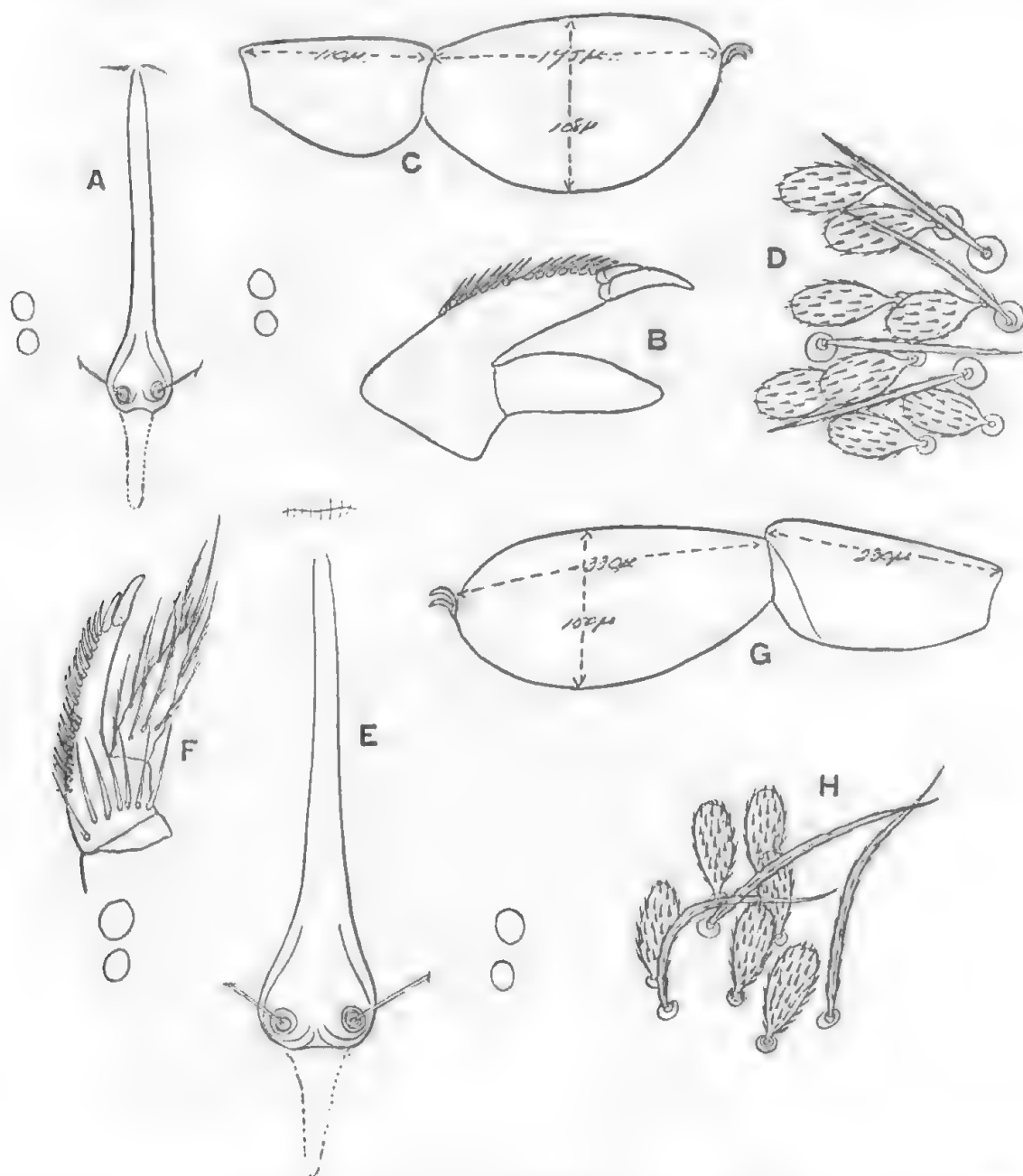


Fig. 7. A-D. *Spathulathrombium queenslandiae* sp. n. A, Crista and eyes ( $\times 200$ ); B, front tarsus and metatarsus ( $\times 200$ ); C, palpal tibia and tarsus ( $\times 375$ ); D, dorsal setae ( $\times 375$ ). E-H. *Spathulathrombium fulgidum* sp. n. E, Crista and eyes ( $\times 200$ ); F, front tarsus and metatarsus ( $\times 200$ ); G, palpal tibia and tarsus ( $\times 200$ ); H, dorsal setae ( $\times 375$ ).

*Loc.* A single specimen from amongst Lantana debris, Gympie, Queensland. April 27, 1940 (D.J.W.S.).

*Remarks.* This species is very close to the next *S. fulgidum* sp. n. in the form and size of the shorter dorsal setae but differs in the dimensions of the front tarsi, straighter and relatively more uniform longer dorsal setae, the much less slender palpi, and in size.

## SPATHULATHROMBIUM FULGIDUM sp. nov.

Fig. 7 E-H.

Description. Adult. Colour red. Shape as in other species but shoulders not very pronounced. Length 1.575 mm., width 0.9 mm. Legs shorter than body, I 1445 $\mu$ , II 1050 $\mu$ , III 975 $\mu$ , IV 1350 $\mu$ , tarsus I 330 $\mu$  long by 150 $\mu$  high, metatarsus I 230 $\mu$  long. Crista linear, 420 $\mu$  long, with subposterior sensillary area, but crista behind sensillary area evanescent, with paired filamentous, apparently nude sensillae, their bases 25 $\mu$  apart. Mandibular chelae with finely serrated inner edge. Palpi as figured, distal part of tibia slender and long, tarsus rather conical only reaching to base of claw. Eyes 2+2, apparently not on ocular shields. Dorsal setae of two kinds and lengths; smaller to 32 $\mu$  long, spathulate or battle-dore shaped with short strong denticles; longer setae spine-like, strongly curved, more slender than in *queenslandiae*, 70–90 $\mu$  long, with indistinct short serrations.

Loc. A single specimen from Robe, South Australia, 13th Oct., 1943 (H.W.).

Remarks. Close to *queenslandiae* but differing as discussed under that species.

## SPATHULATHROMBIUM MYLORIENSE sp. nov.

Fig. 8 A-D.

Description. Adult. Colour red. Shape as in other species, shoulders not prominent. Length 2.55 mm., width 1.35 mm. Legs not longer than body, I 1275 $\mu$ , II 900 $\mu$ , III 930 $\mu$ , IV 1200 $\mu$ , tarsus I 285 $\mu$  long by 93 $\mu$  high, metatarsus I 185 $\mu$  long. Crista elongate, 375 $\mu$  long and fairly thick, sensillary area subposterior, but appearing posterior, the crista behind the area being evanescent, with paired nude filamentous sensillae, their bases 21 $\mu$  apart. Eyes 2+2, about on a level with sensillary area and apparently not on ocular shields. Chelae with finely serrated inner edge. Palpi as figured, distal portion of tibia slender, tarsus elongate, conical, reaching just beyond base of claw. Dorsal setae of two kinds and lengths, the smaller spathulate but rather elongate with almost parallel sides, 56 $\mu$  long by 11 $\mu$  wide, and furnished with strong short denticles; longer setae spine-like (cf. fig. 8 D) with ribs of indistinct serrations, to 120 $\mu$  long by 6.5 $\mu$  wide.

Loc. A single specimen from Mylor, South Australia, 14 Sept., 1935 (H.W.).

Remarks. Allied to *queenslandiae* and *fulgidum* but distinct in the form of the dorsal setae and in the dimensions of the front tarsi and metatarsi.

KEY TO THE SPECIES OF *Spathulathrombium*.

1. Dorsal microsetae with long ciliations .. .. . 2.  
Dorsal microsetae with short denticles .. .. . 3.
2. Small species to 1.5 mm. long. Microsetae 26 $\mu$  by 8 $\mu$ , macrosetae spine-like, to 75 $\mu$  long with indistinct serrations, almost straight. T<sub>1</sub> 210 $\mu$  by 105 $\mu$ , M<sub>1</sub> 135 $\mu$ . *southcotti* (Wom.).  
Larger species to 3.0 mm. long. Microsetae 36 $\mu$  by 14 $\mu$ , macrosetae as above, 70–165 $\mu$  long, only slightly curved. T<sub>1</sub> 405–480 $\mu$  by 150–180 $\mu$ , M<sub>1</sub> 300–360 $\mu$ . S.B. 47–50 $\mu$   
*maximum* sp. nov.
3. Larger species to 2.5 mm. long. Microsetae to 56 $\mu$  by 11 $\mu$ , macrosetae to 120 $\mu$  long by 6.5 $\mu$  wide, with only indistinct serrations. T<sub>1</sub> 285 $\mu$  by 93 $\mu$ , M<sub>1</sub> 185 $\mu$ . S.B. 21 $\mu$ .  
*myloriense* sp. nov.  
Smaller species to ca. 1.7 mm. long. Microsetae 32 $\mu$  long, with curved sides. Macrosetae with distinct denticles .. .. . 4.
4. Macrosetae almost or quite straight, uniform to 70 $\mu$  in length. T<sub>1</sub> 162 $\mu$  by 95 $\mu$ , M<sub>1</sub> 108 $\mu$ . SB 21 $\mu$  .. .. . *queenslandiae* sp. nov.  
Macrosetae strongly curved, not stiff, from 70–90 $\mu$  long. T<sub>1</sub> 330 $\mu$  by 150 $\mu$ , M<sub>1</sub> 236 $\mu$ . SB 25 $\mu$   
*fulgidum* sp. nov.

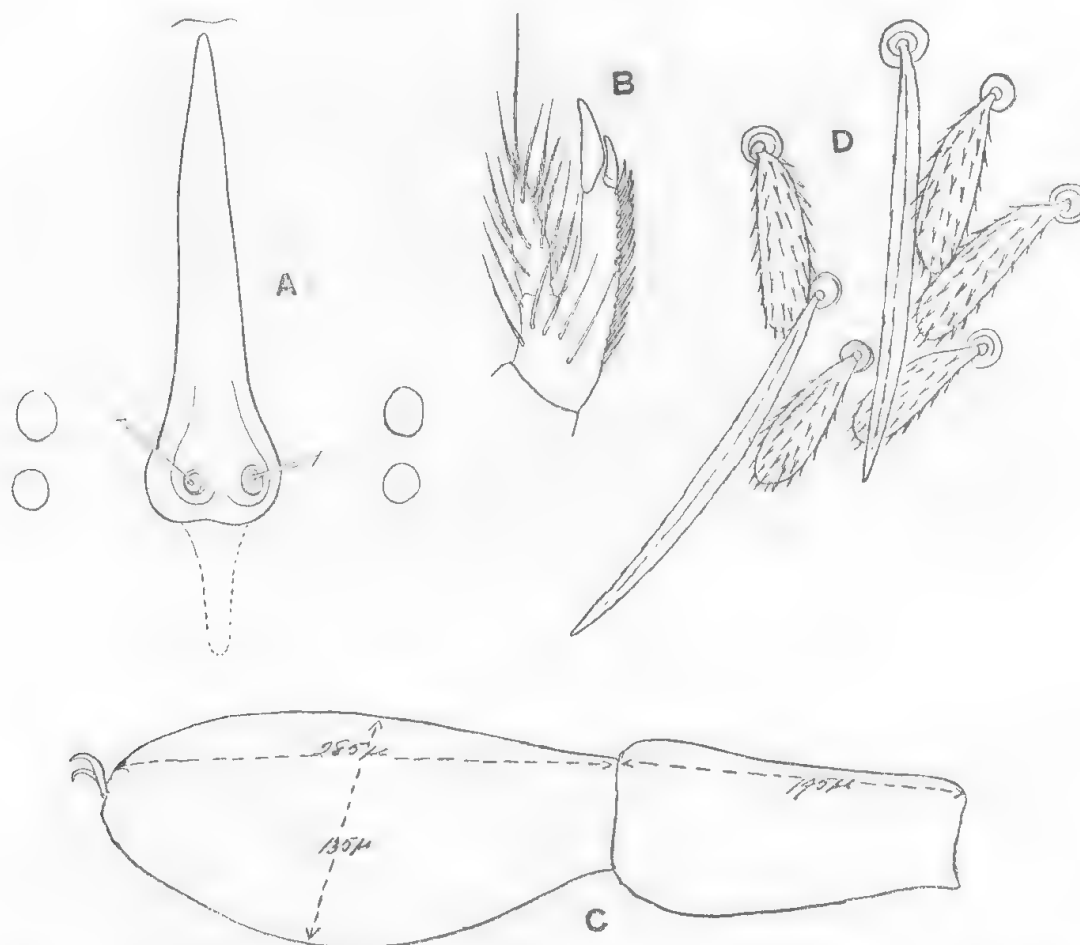


Fig. 8. *Spathulathrombium myloriense* sp. n. A, Crista and eyes ( $\times 200$ ); B, palpal tibia and tarsus ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 200$ ); D, dorsal setae ( $\times 375$ ).

Genus *MICROTROMBIDIUM* Haller, 1882 s.str.

Milbenf. Wurtemb., 1882.

Genotype. *M. pusillum* Hermann, 1804.

*Manriquia* Boshell and Kerr, 1942 (in part) Rev. Acad. Columbiana Ci. Ex., 5, 110-127.

*Microtrombidium* Boshell and Kerr, 1942 *ibid.* (in part).

As in the subfamily but restricted to those in which the legs are not, or not much longer than the body and in which the dorsal setae, even if of two different lengths, are pennate or as slender rods with long ciliations. Palpal tibia with or without accessory claw, and without or with one or two external spines.

The members of this genus are very difficult to separate, and the specific characters lie principally in the dimensions of the front tarsi and metatarsi and in the lengths and structure of the dorsal setae. In reviewing this genus, all my old material has been restudied more carefully and, with more material before me, it is evident that several species are synonymous and are here sunk.

The three species *barringunense* Hirst, *retentus* Banks and *westraliense* Wom. are herewith removed from *Microtrombidium* and will be later allocated to their proper position.

## MICROTROMBIDIUM ZELANDICUM Wom., 1936.

Fig. 9 A-D.

*Microtrombidium zelandicum* Womersley, 1936, J. Linn. Soc. London, Zool. 40, 107, fig. 1 a-e.

Redescription. Colour (in spirit) white, in life probably red. Shape roughly elliptical, without pronounced shoulders. Length 1.81 mm., width 0.9 mm. Legs not much longer than body, I 2100 $\mu$ , II 1010 $\mu$ , III 940 $\mu$ , IV 1810 $\mu$ , tarsus I elongate, 480 $\mu$  long by 145 $\mu$  high, metatarsus I 320 $\mu$  long. Crista linear, 438 $\mu$  long, with

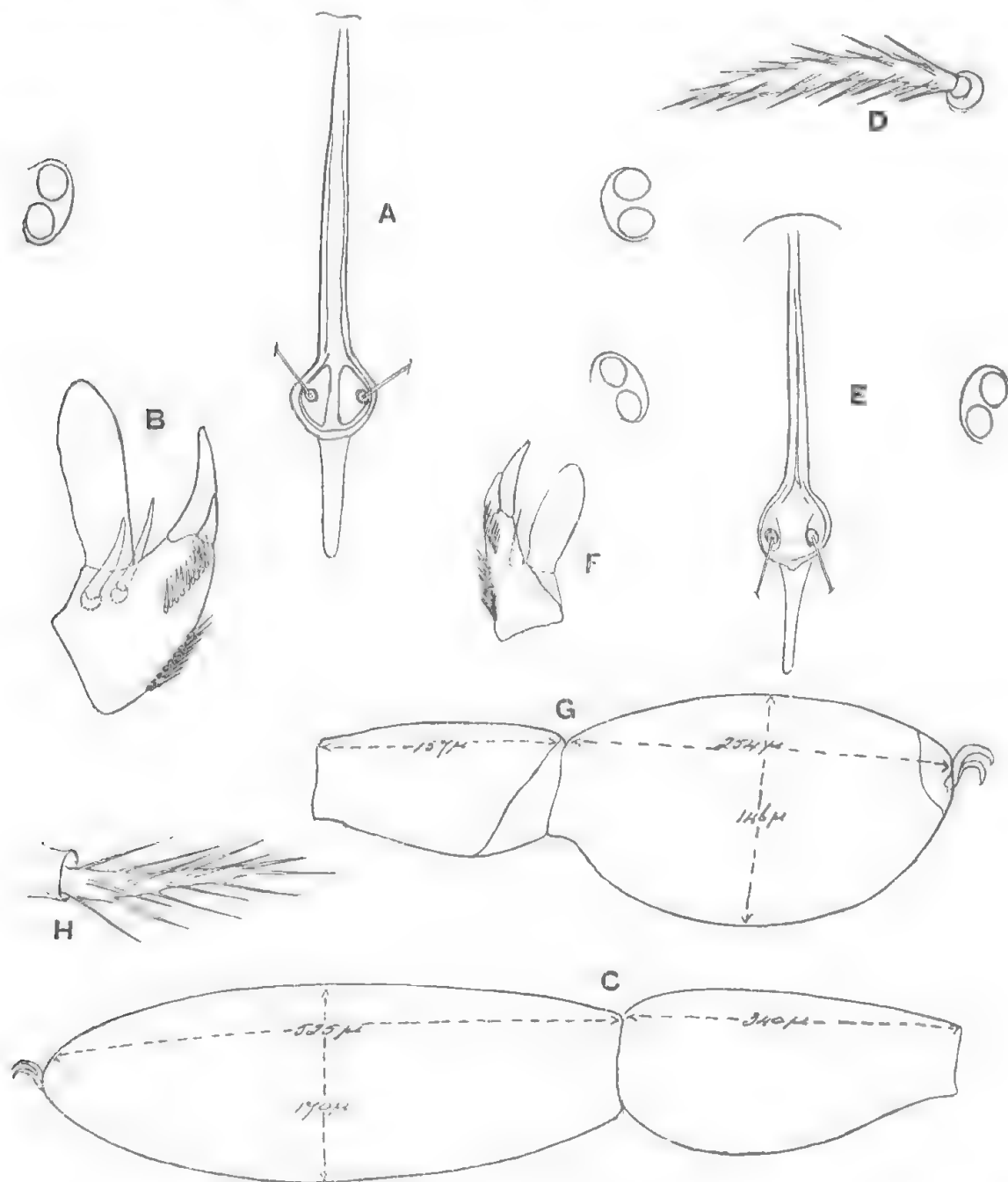


Fig. 9. A-D. *Microtrombidium zelandicum* Wom. A, Crista and eyes ( $\times 200$ ); B, palpal tibia and tarsus ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 125$ ); D, dorsal setae ( $\times 860$ ). E-H. *Microtrombidium maculatum* Wom. E, Crista and eyes ( $\times 200$ ); F, palpal tibia and tarsus ( $\times 200$ ); G, front tarsus and metatarsus ( $\times 200$ ); H, dorsal setae ( $\times 860$ ).



subposterior area at about  $\frac{2}{3}$  from apex, sensillae long and filamentous and their bases  $36\mu$  apart. Eyes 2+2, well in advance of sensillary area, and on distinct ocular shields. Palpi as figured with strong tibial claw and accessory claw, two pectines and on external side with two strong spines arising from behind base of tarsus; tarsus elongate, slightly clavate and overreaching tip of claw. Dorsal setae uniform in length,  $30\mu$ , tapering and with long ciliations (cf. fig. 9D).

*Loc.* Pukekarura Creek, Niger Bay, Manurewa, New Zealand, 31st Dec. 1932 (E.D.P.). One specimen.

Remarks. Distinguished from other species as in the key.

MICROTROMBIDIUM MACULATUM Wom., 1942.

Rec. S. Aust. Mus., 7 (2), 175; fig 6 A-E.

Fig. 9 E-H.

Redescription. Adult. Colour in life dark red except in the area of the crista and eyes and on fifteen round spots on the dorsum where it is white. Shape elongate oval, broadest across shoulders. Length 1.04 mm., width 0.720 mm. Legs relatively short, I  $1040\mu$ , II  $608\mu$ , III  $480\mu$ , IV  $720\mu$ , tarsus I about twice as long as high,  $255\mu$  by  $125\mu$ , metatarsus I  $150\mu$  long. Crista linear,  $270\mu$ , with subposterior sensillary area at  $\frac{2}{3}$  from apex, furnished with paired filamentous sensillae,  $108\mu$  long and their bases  $30\mu$  apart. Eyes 2+2, on distinct ocular shields and well in advance of sensillary area. Palpi as figured, tibia with strong apical claw, smaller accessory claw, two pectines and one slender external spine arising from near base of tarsus; tarsus elongate, hardly clavate and not reaching tip of claw. Dorsal setae uniform, fairly thick stemmed,  $25\mu$ , and with long setules (cf. fig. 8H).

*Loc.* A single specimen from a rotting tree-fern log, Belgrave, Vic., Nov., 1941 (O.W.T.).

Remarks. The only Australian species yet known with white maculations.

MICROTROMBIDIUM KARRIENSIS Wom., 1934.

Rec. S. Aust. Mus., 1934, 5 (2), 191, fig. 28-30.

*M. (M.) tasmanicum* Womersley, 1937, *ibid*, 6 (1), 88, fig. 1 k-m.

Fig. 10 A-E.

Redescription. Adult. Colour in life red. Body more or less elliptical with rounded not prominent shoulders, narrowing in region of coxae IV and rounded posteriorly. Size variable, length to 1.95 mm., width to 1.20 mm. (in type 1.20 mm. and 0.78 mm.), legs not longer than body, in type I  $1080\mu$ , II  $730\mu$ , III  $700\mu$ , IV  $1050\mu$ , tarsus I as figured, elliptical but greatest height near to base, and there roundly angulate, length (13 specimens)  $346\mu$  to  $164\mu$ , height  $182\mu$  to  $101\mu$ , averaging  $250\mu$  by  $134\mu$ , the ratio of height to length averaging 1.0:1.9; metatarsus I  $200\mu$  to  $86\mu$  long (average  $134\mu$ ). Crista linear, type  $256\mu$  long, with subposterior sensillary area, at about  $\frac{3}{4}$  from apex, with paired apparently nude filamentous sensillae ca.  $120\mu$  long, and their bases  $32\mu$  apart. Eyes 2+2, on ocular shields well in front of sensillary area. Mandibles with stout chelae with serrate inner edge. Palpi as figured, tibia with external spine arising from near base of tarsus and reaching beyond middle of claw; tarsus elongate, slender, slightly conical, and reaching to middle of claw. Dorsal setae dense and uniform, thick stemmed,  $30\mu$  long (cf. fig. 10E) with long ciliations. On the legs the setae are similar but slightly longer.

*Loc.* Apparently a common and widely distributed species. Type from Denmark, Western Australia, June 6, 1933 (H.W.).

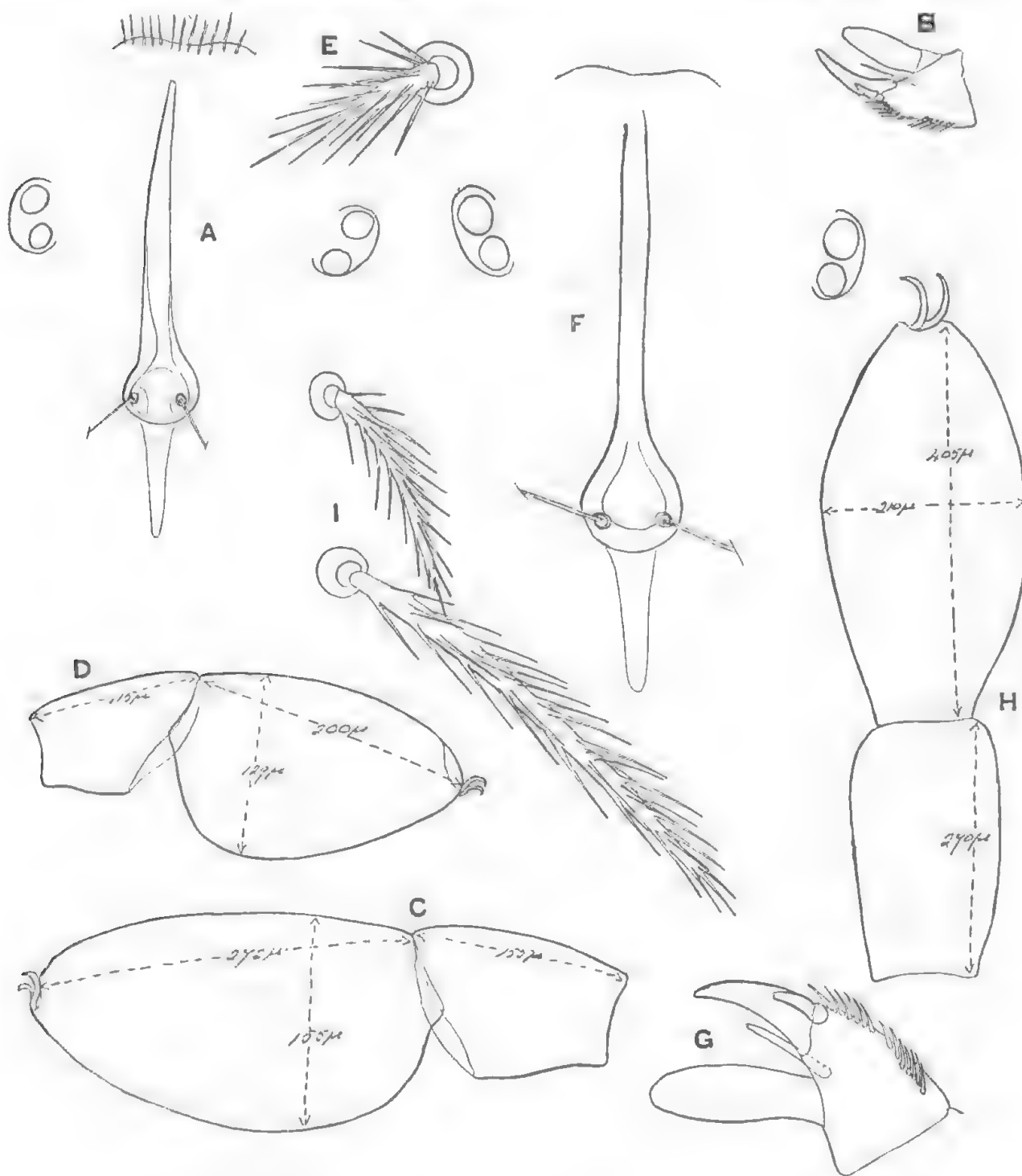


Fig. 10. A-E. *Microtrombidium karriensis* Wom. A, Crista and eyes ( $\times 200$ ); B, palpal tibia and tarsus ( $\times 200$ ); C, front tarsus and metatarsus ♀ ( $\times 200$ ); D, same ♂ ( $\times 200$ ); E, dorsal seta ( $\times 860$ ). F-I. *Microtrombidium hirsutum* sp. n. F, Crista and eyes ( $\times 200$ ); G, palpal tibia and tarsus ( $\times 200$ ); H, front tarsus and metatarsus ( $\times 200$ ); I, dorsal setae ( $\times 860$ ).

Other specimens: South Australia: Belair, 1935-1938, from May to July, in moss; Blewett's Springs, near Clarendon, June 1944; Tasmania: Mt. Wellington, Sept. 1935, Dec. 1937.

Remarks. This species is closely related to *M. pusillum* (Hermann, 1804) Berl., 1912, from Europe, of which Berlese (1912) has described the varieties *columbianum* from North America and *balzani* from South America. Our spe-

cies differs from *pusillum* in the presence of the external spine on the palpal tibia. In having only one such spine it also agrees with *americanum* (Leon.) from Chile, and with *jabanicum* Berl. from Java. It differs from *americanum*, however, in the form and dimensions of the front tarsi and metatarsi, but agrees in these characters with *pusillum* and *jabanicum*. In the last species the external spine on the palpal tibia is short and arises close to the base of the claw (cf. Berl., 1912); in *karriensis* it is long and more slender and arises from near the articulation of the tarsus. The dorsal setae are about as long as, but thicker stemmed than, in *pusillum*, and shorter than in *americanum*.

The species is somewhat variable in size and also in the dimensions, but not the relative proportions of the front tarsi and metatarsi.

In the following table are given the measurements in microns, of thirteen specimens including the type.

Loc.	Length.	Width.	TARSUS I.			METATARSUS I.		CRISTA.		
			Lgh.	Ht.	L/H.	Lgh.	Lt/Lm.	Lgh.	SB.	DS.
Denmark, W.A.	1,200	780	272	155	1.78	155	1.78	330	32	30
Belair, S.A.	1,800	1,050	346	153	2.26	200	1.73	405	29	30
" "	1,200	900	292	133	2.19	150	1.95	346	29	30
" "	1,875	1,150	292	130	2.25	140	2.08	—	—	29
" "	1,950	1,200	310	182	1.70	182	1.70	405	32	30
" "	1,500	975	292	126	2.31	130	2.25	328	25	29
" "	1,125	720	164	86	1.91	86	1.91	236	25	29
" "	1,125	720	210	112	1.87	115	1.83	310	25	29
" "	1,170	750	218	115	1.90	119	1.83	325	32	29
" "	1,425	950	235	122	2.10	126	1.86	328	29	30
" "	1,200	770	189	100	1.89	101	1.89	255	25	29
" "	1,350	900	218	122	1.78	126	1.73	—	—	29
" "	1,250	810	200	101	2.00	108	1.85	272	29	30

A study of the above measurements suggests that the specimens 2, 4 and 5 in which the values are much higher than for the others may be females, the rest males. All the thirteen were fully adult as shown by the three pairs of genital discs.

A single specimen from Long Gully, South Australia, 11th June, 1938, measured  $1500\mu$  long with tarsus I  $195\mu$  by  $100\mu$ , and metatarsus  $105\mu$ , but had the dorsal setae  $40-43\mu$  long. It may perhaps be considered a variety.

The two specimens described as *tasmanicum* Wom., 1937 (*loc. cit.*) as well as two others from Mt. Wellington, Tas., Dec., 1937, agree with *karriensis* except that in the first two, the ratio of length of tarsus I to metatarsus I is 1.0:1.40 and 1.0:1.32.

#### MICROTROMBIDIUM HIRSUTUM sp. nov.

##### Fig. 10 F-I.

Description. Adult. Length 2.1 mm., width 1.5 mm. Colour in life red. Shape as in other species. Legs I  $1875\mu$ , II  $1275\mu$ , III  $975\mu$ , IV  $1425\mu$ ; front tarsus  $405\mu$  long by  $210\mu$  high, metatarsus  $270\mu$  long. Crista elongate,  $460\mu$  long, with subposterior sensillary area, paired filamentous sensillae with their bases  $25\mu$  apart. Eyes 2+2, on distinct ocular shields. Palpi stout, tibia with stout apical claw, smaller accessory claw, two pectines, and a strong external spine. Dorsal setae slender with only moderately long setules (cf. fig. 10 I) varying in size from  $40\mu$  to  $75\mu$ , but with no sharp demarcation into two distinct sizes.

Loc. A single specimen from Morialta, South Australia, 2nd Sept., 1934. (H.W.).

Remarks. Separated as in the key to species on the dorsal clothing and the dimensions of the front tarsi and metatarsi.

## MICROTROMBIDIUM WELLINGTONENSE sp. nov.

Fig. 11 A-C.

Description. Nymph. Colour in life red. Shape as in other species of the genus. Length 1.725 mm.; width 1.05 mm. Legs all shorter than body, I 930 $\mu$ , II 600 $\mu$ , III 600 $\mu$ , IV 930 $\mu$ ; tarsus I 282 $\mu$  long by 133 $\mu$  high, metatarsus I 160 $\mu$  long.

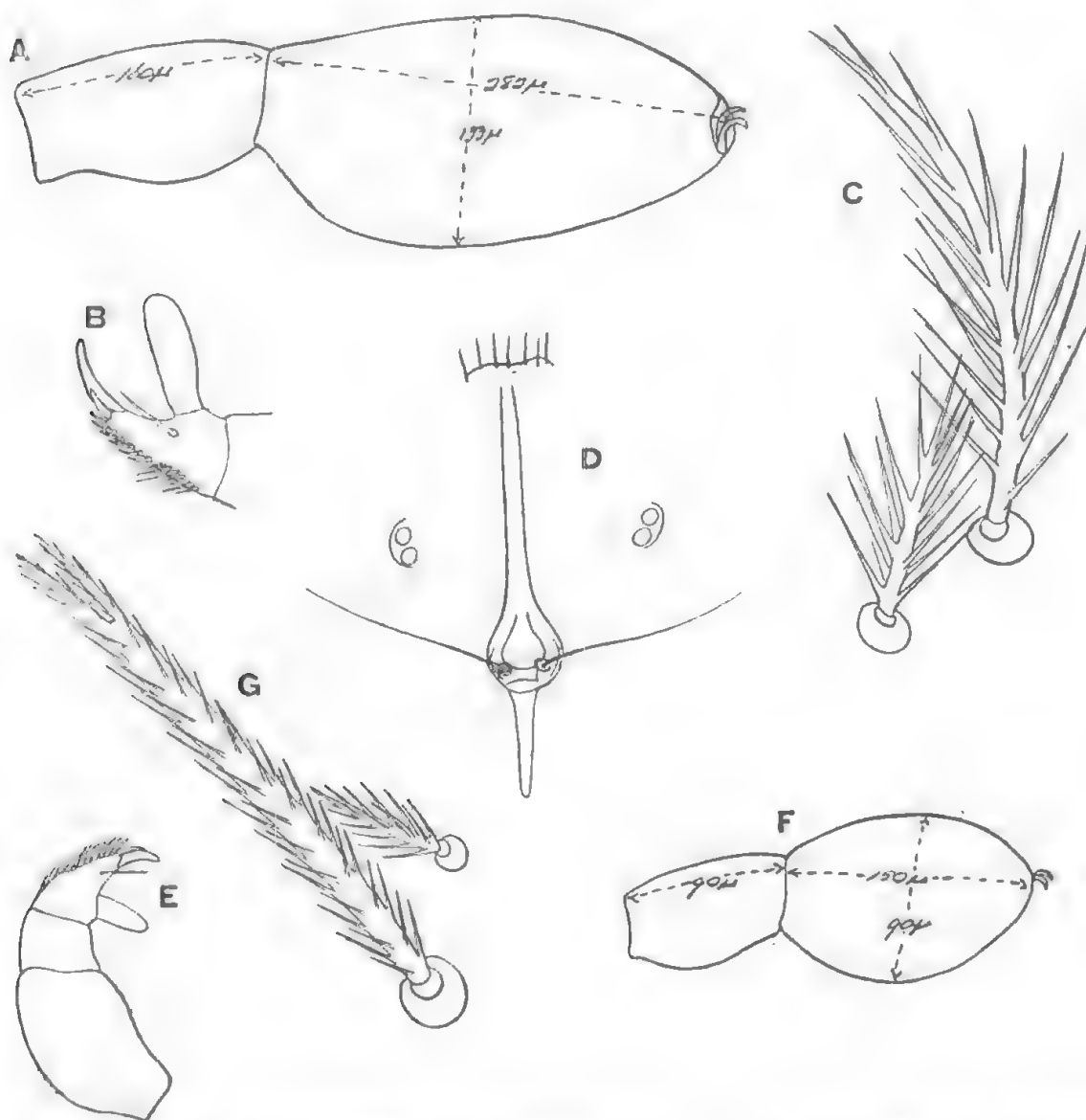


Fig. 11. A-C. *Microtrombidium wellingtonense* sp. n. A, Front tarsus and metatarsus ( $\times 200$ ); B, palpal tibia and tarsus ( $\times 200$ ); C, dorsal setae ( $\times 860$ ). D-G. *Microtrombidium fureipile* (Canest). D, Crista and eyes ( $\times 200$ ); E, palp ( $\times 200$ ); F, front tarsus and metatarsus ( $\times 200$ ); G, dorsal setae ( $\times 860$ ).

Crista and eyes not available for description owing to damage. Palp stout, tibia with the usual strong claw and accessory claw and two pectines and with one slender external spine arising near articulation of tarsus (cf. fig. 11 B); tarsus elongate, over-reaching tip of claw. Chelicerae with finely serrate inner edge. Dorsal setae slender with very long setules (cf. fig. 11 C), length varying from 40 $\mu$  to 80 $\mu$  posteriorly but without any clear demarcation into two sizes.

Loc. One specimen from Mt. Wellington, Tas., Dec. 9th, 1937 (J.W.E.).

*MICROTROMBIDIUM PAPUANUM* sp. nov.

## Fig. 12 A-D.

**Description.** Adult. Colour in life red. Shape as in other species of the genus. Length 1.05 mm., width 0.6 mm. Legs shorter than the body, I 855 $\mu$ , II 540 $\mu$ , III 540 $\mu$ , IV 750 $\mu$ , tarsus I broadly elliptical with ventrobasal shoulder, 151 $\mu$  long by 100 $\mu$  high, metatarsus I 90 $\mu$  long. Crista linear, 218 $\mu$  long, with subposterior sensillary area with paired filamentous sensillae, their bases 20 $\mu$  apart. Eyes 2+2, large, on well defined ocular shields. Mandibles with chelae finely serrated on inner edge. Palpi stout, tibia normal, with slender external spine; tarsus elongate, reaching to about tip of claw. Dorsal setae of two sizes as in fig. 12 D, more or less fusiform, with only moderately long setules, shorter setae 16 $\mu$  long, longer setae to 32 $\mu$  long.

**Loc.** Two specimens in soil, Dobodura area, New Guinea, about July, 1944 (G. M. Kohls). Four other specimens from Goodenough Is., Aug., 1944 (D.C.S.) in damp soil in typhus area, do not differ in the dorsal setae, although the dimensions of the front tarsi and metatarsi are somewhat variable, as given in the following key to species.

*MICROTROMBIDIUM MYLORIENSE* sp. nov.

## Fig. 12 E-H.

**Description.** Adult. Colour in life red. Shape as in other species. Length to 2.5 mm., width to 1.8 mm. Legs shorter than body, I 1500 $\mu$ , II 1050 $\mu$ , III 1000 $\mu$ , IV 1445 $\mu$ , tarsus I more or less parallel sided and elongate, 405 $\mu$  long by 120 $\mu$  high, metatarsus 240 $\mu$  long. Crista linear, 390 $\mu$  long, with subposterior sensillary area with paired filamentous sensillae with their bases 40 $\mu$  apart (cf. fig. 12 E). Eyes 2+2, fairly large and on well chitinized ocular shields. Mandibles with chelae finely serrate on inner edge. Palpi stout, tibia normal with stout accessory claw, two pectines and a fairly stout pointed external spine (cf. fig. 12 F); tarsus elongate, only barely reaching tip of claw. Dorsal setae of two sizes, the larger to 55 $\mu$  long, stout, thick, only slightly pointed at apex, the smaller to 21 $\mu$  long, relatively slightly more slender than longer setae, both sizes with fairly long outstanding setules (cf. fig. 12 H).

**Loc.** The type and 1 paratype, Mylor, South Australia, Oct., 1935; two other specimens Mylor, 14th Sept., 1935, and Belair, S. Aust., 26th Sept., 1927.

*MICROTROMBIDIUM* cf. *FURCIPILIS* (Canestrini, 1897).

*Ottonia furcipilis* G. Canest., 1897, Ved. Atti. Soc. Veneto. Trentina, 2, 3; 2, 398; Termes. Fuzet., 21, 483.

*Microtrombidium furcipile*, Berl., 1912, Redia, 8, 161.

*Microtrombidium hystricinum*, Womersley, 1924. Rec. S. Aust. Mus., 7 (2), 177 (in part).

## Fig. 11 D-G.

This species was originally described by Canestrini from Erima, New Guinea. I have recently received specimens of what I take to be Canestrini's species from Dobodura area, New Guinea and collected in soil by Maj. G. M. Kohls. Further I now find that the specimens from Malanda, Queensland, previously recorded by me as *hystricinum* (*loc. cit.*) are co-specific with those received from New Guinea.

Canestrini speaks of some of the longer dorsal setae as being "biforeate" and in the specimens now referred to his species some of these seta, although



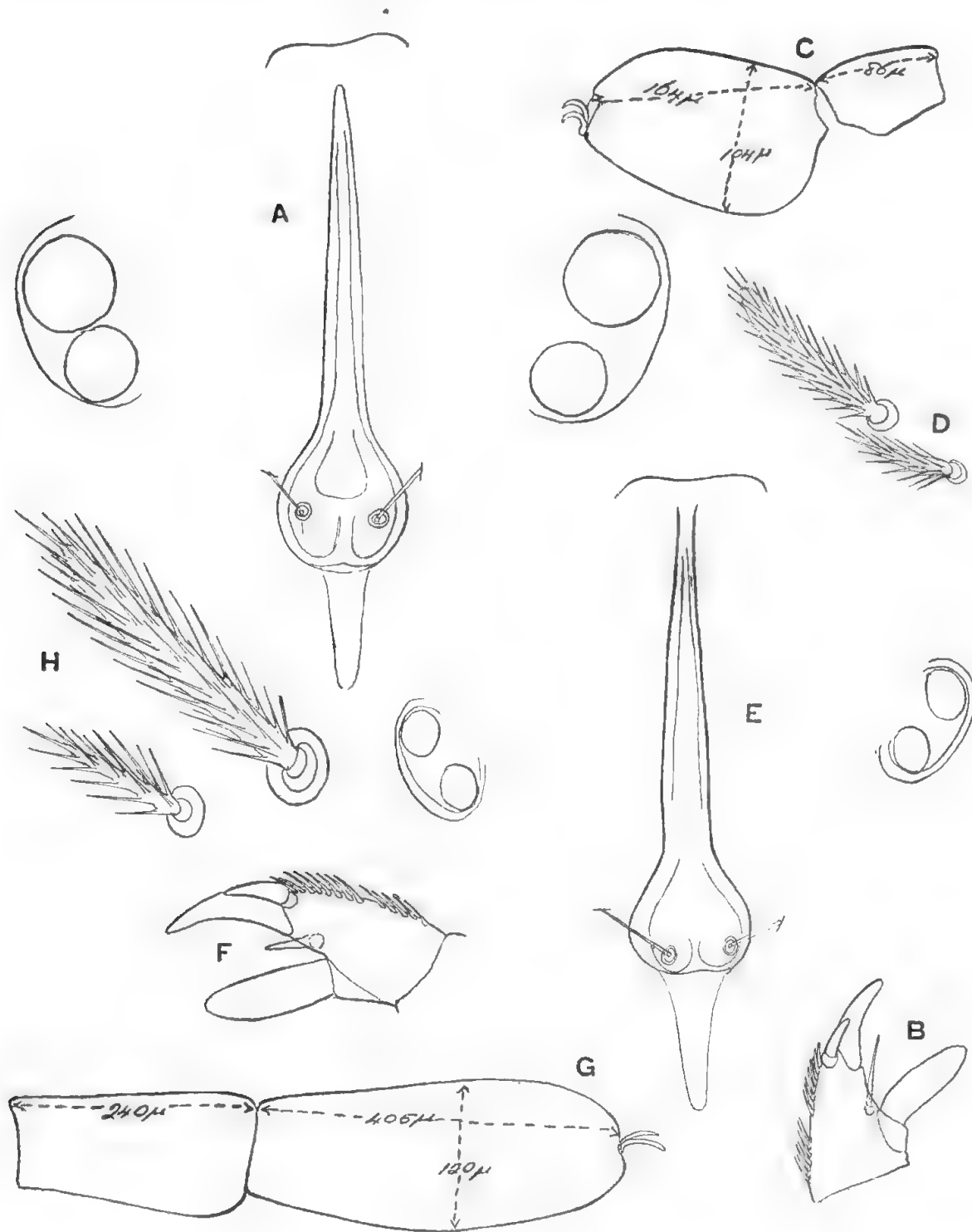


Fig. 12. A-D. *Microtrombidium papuanum* sp. n. A, Crista and eyes ( $\times 375$ ); B, palpal tibia and tarsus ( $\times 375$ ); C, front tarsus and metatarsus ( $\times 200$ ); D, dorsal setae ( $\times 860$ ). E-H. *Microtrombidium myloriense* sp. n. E, Crista and eyes ( $\times 200$ ); F, palpal tibia and tarsus ( $\times 375$ ); G, front tarsus and metatarsus ( $\times 125$ ); H, dorsal setae ( $\times 860$ ).

not strictly bifurcate, are bifid or split for a short distance at the tip, but the prongs of the fork are not spread out.

The description given by Canestrini for many species of Trombididae are, however, so brief and inadequate and without figures that one cannot be quite sure of what he meant. *Furciple* is the only species which he described as having furcate setae, and as some of my specimens are from New Guinea, they are referred to his species, although somewhat tentatively.

**Description.** Adult. Colour red, shape ovoid, shoulders not very pronounced. Length 0.9 mm., width 0.55 mm. Legs not longer than body, I 740 $\mu$ , II 420 $\mu$ , III 400 $\mu$ , IV 550 $\mu$ ; tarsus I 150 $\mu$  by 90 $\mu$  high, metatarsus I 90 $\mu$  long. Eyes 2+2, on ocular shields in advance of sensillary area. Crista as figured, 220 $\mu$  long with subposterior sensillary area at about  $\frac{2}{3}$  from apex, sensillae 146 $\mu$  long and apparently nude, with bases 21 $\mu$  apart. Palpi as figured, tibia with one tapering external spine, tarsus rather short and not reaching tip of tibial claw. Dorsal setae of two forms and sizes, the smaller tapering, 16-20 $\mu$  long, pinnate with long ciliations, the larger 60-75 $\mu$  long rod-like, with moderate long setules and split at the apex for approximately 7 $\mu$ .

**Loc.** Five specimens from soil collected by Maj. G. M. Kohls, April, 1944, Dobodura area of New Guinea; also two specimens from English Jungle, Malanda, Queensland, August, 1935 (previously recorded (1937) as *hystrixium* Canest.).

**Remarks.** This species was apparently described without any figures and it is therefore rather uncertain what Canestrini means by "l'estremita distale equi biforcate." As however, his *furciple* is the only species with forked setae previously recorded from New Guinea the material before me is referred to it.

#### MICROTROMBIDIUM AEQUALIS (Banks, 1916).

*Trombidium aequalis* Bks., 1916, Trans. Roy. Soc. S. Aust. 40, 226, pl. xxiii, Fig. 1.

*Microtrombidium aequalis* Wom., 1934. Rec. S. Aust. Mus., 5 (2), 191.

#### Fig. 13 A-G.

A female specimen from Greenbushes, Western Australia, was referred to this species (1934) the type of which is now not in the South Australian Museum. This female is now described, as is also a smaller specimen, probably a male, from New Guinea.

**Description of female.** In life red. Shape cordate as in other species of the genus. Length 1.2 mm., width 0.75 mm. Legs not longer than the body, I, stronger and stouter than the others, I 1150 $\mu$  long, II 675 $\mu$ , III 750 $\mu$ , IV 1275 $\mu$ , tarsus I elliptical ovate, about twice as long as high, 300 $\mu$  by 157 $\mu$ , metatarsus 190 $\mu$  long, claws slightly unequal. Crista linear, 318 $\mu$  long with subposterior sensillary area, with sensillae bases 21 $\mu$  apart, sensillae filamentous. Eyes 2+2, sessile, on distinct ocular shields. Chelicerae finely serrate on inner edge. Palpi stout (cf. fig. 13 B), tibia with strong claw and accessory claw, two pectines and a slender external spine; tarsus elongate, only slightly clavate, not reaching tip of claw. Dorsal setae relatively sparse, uniform, more or less pinnate, with long setules, to 16 $\mu$  long.

**Description of male?** Similar to female. Length 1.05 mm., width 0.75 mm. Legs I 930 $\mu$ , II 630 $\mu$ , III 630 $\mu$ , IV 630 $\mu$ , tarsus I as in female, 228 $\mu$  long by 118 $\mu$  high, metatarsus 145 $\mu$ , claws slightly unequal. Crista 310 $\mu$  long, the portion posterior of the sensillary area evanescent with only the more chitinous tip evident, sensillae bases 21 $\mu$  apart. Eyes, chelicerae and palpi as in female. Dorsal setae also as in adult but slightly more sparse.

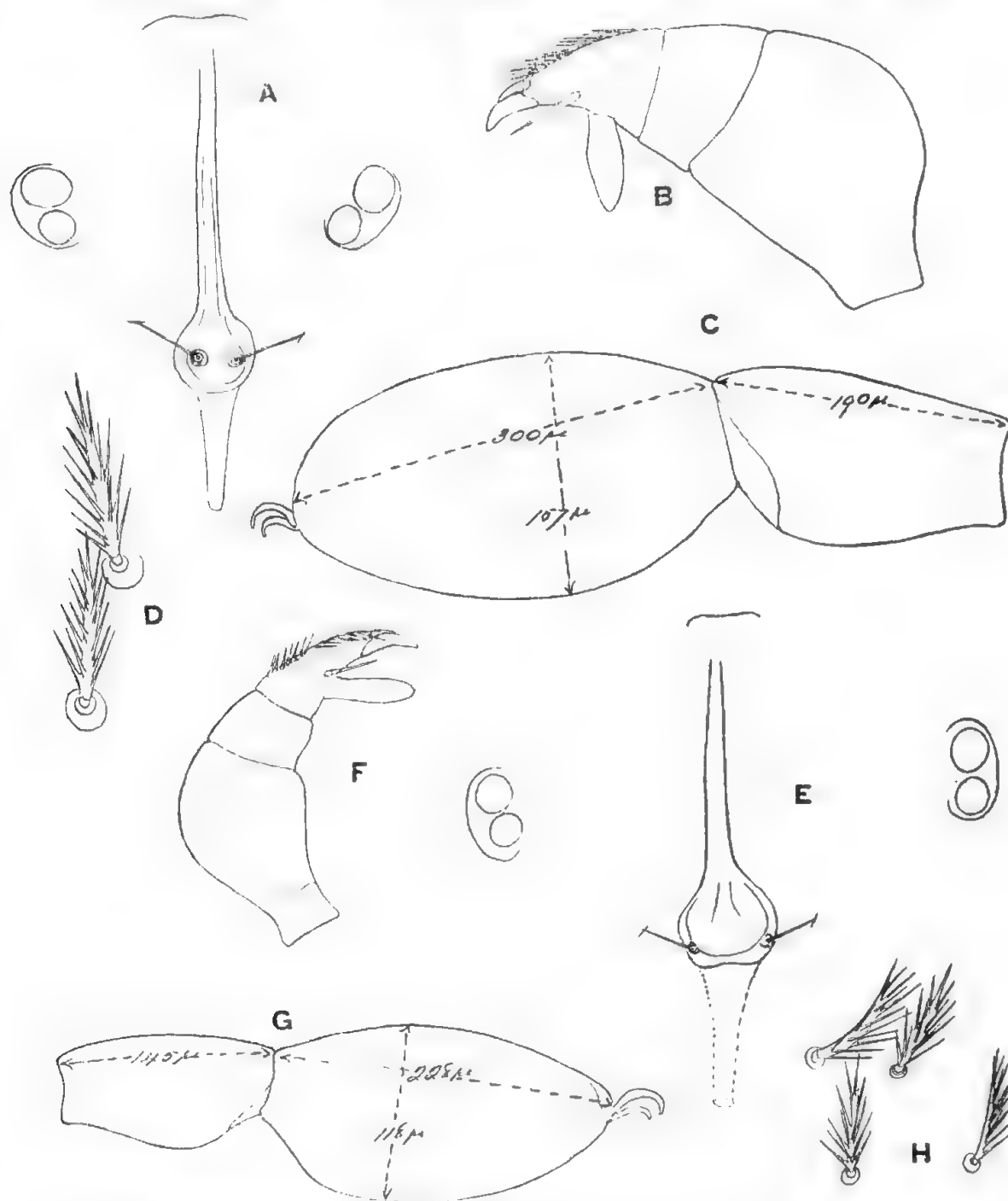


Fig. 13. *Microtrombidium aequalis* (Banks). A-D. ♀. A, Crista and eyes ( $\times 200$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 200$ ); D, dorsal setae ( $\times 860$ ). E-H. ♂. E, Crista and eyes ( $\times 200$ ); F, palp ( $\times 200$ ); G, front tarsus and metatarsus ( $\times 200$ ); H, dorsal setae ( $\times 860$ ).

*Loc.* Adult female from Greenbushes, Western Australia, 28th Aug., 1931 (H.W.). ? Male from soil, Dobodura area, New Guinea, 1944 (G. M. Kohls).

*Remarks.* In the nature of the dorsal setae and of the palpi and crista as well as the proportions of length and height of tarsi I and the ratio of length of tarsi I to metatarsi I there seems little doubt but that the above specimens are of the same species and although Banks's figures and descriptions are inadequate yet it appears reasonable to refer them to his species.

## MICROTROMBIDIUM AFFINE Hirst, 1928.

Proc. Zool. Soc. London, 1928, 1026, text, fig. 3 D.

Fig. 14 A-D.

Redescription of type. Colour in life probably red. Shape cordate as in other species of the genus. Length 1.16 mm., width 0.81 mm. Legs I 1040 $\mu$ , II 825 $\mu$ , III 750 $\mu$ , IV 1125 $\mu$ , tarsus I 292 $\mu$  long by 129 $\mu$  high, highest in the middle,  $T_1/T_w = 2.26$ , metatarsus 230 $\mu$ ,  $T_1/M_1 = 1.26$ . Eyes 2+2, sessile. Crista linear, 345 $\mu$  long, with subposterior sensillary area, SB 25 $\mu$  apart. Sensillae filamentous. Palpi stout with strong apical and smaller accessory claw, two pectines but no external spine. Chelicerae finely serrate on inner margin. Dorsal setae uniform in length to 40 $\mu$ , with strong, fairly long setules.

*Loc.* Besides the type, in the S. Aust. Mus. collected by J. S. Clark, Swan River, Western Australia, I refer another specimen from Adelaide, 1933 (H.W.), to this species.

## MICROTROMBIDIUM NEWMANI Wom., 1934.

*M. (Enemothrombium) newmani* Womersley, 1934. Rec. S. Aust. Mus., 5 (2), 194, Fig. 40-42.

Fig. 14 E-II.

Redescription of type. Colour in life red. Shape cordate as in other species of the genus. Length 0.975 mm., width 0.62 mm. Legs I 825 $\mu$ , II 570 $\mu$ , III 525 $\mu$ , IV 825 $\mu$ , tarsus I 235 $\mu$  long by 140 $\mu$  high,  $T_1/T_w = 1.67$ , metatarsus I 126 $\mu$  long,  $T_1/M_1 = 1.86$ . Eyes 2+2, sessile, on distinct ocular shields. Crista linear, 252 $\mu$  long, with subposterior sensillary area and SB 25 $\mu$  apart, sensillae filamentous. Chelicerae finely serrated on inner edge. Palpi stout, tibia with strong apical and stout accessory claws, two pectines, but no external spine. Dorsal setae mainly short, somewhat curved and tapering to 24 $\mu$  long, with curved setules, but rather sparsely interspersed with long clavate or bushy setae, to 80 $\mu$  long, furnished with only moderately long setules.

*Loc.* Type from Bedforddale, Western Australia, 29th Nov., 1931 (L.W.N.), and another specimen from Mandurah, Western Australia, 30th May, 1931 (H.W.).

## MICROTROMBIDIUM ADELAIDICUM Wom., 1934.

*M. (Enemothrombium) adalaidicum* Womersley, 1934. Rec. S. Aust. Mus., 5 (2), 194, fig. 38-39.

*M. (Microtrombidium) adalaidicum* Womersley, 1937. Rec. S. Aust. Mus., 6 (1), 88.

*M. (Microtrombidium) tubbi* Womersley, 1942. Rec. S. Aust. Mus., 7 (2), 176, Fig. 7 A-C.

Fig. 15 A-D.

Redescription of type. Colour in life red. Shape cordate as in other species of the genus. Length 0.975 mm., width 0.6 mm. Legs I 720 $\mu$ , II 510 $\mu$ , III 510 $\mu$ , IV 825 $\mu$ , tarsus I broadly oval, widest at about the middle, 198 $\mu$  long by 118 $\mu$  high,  $T_1/T_w = 1.68$ , metatarsus 112 $\mu$  long,  $T_1/M_1 = 1.77$ . Crista linear, 234 $\mu$  long, with subposterior sensillary area, with SB 30 $\mu$  apart, sensillae filamentous. Eyes 2+2, sessile, on distinct ocular shields. Chelicerae with finely serrate inner margin. Palpi stout, tibia with strong terminal and small accessory claw, two pectines and a slender pointed external spine. Dorsal

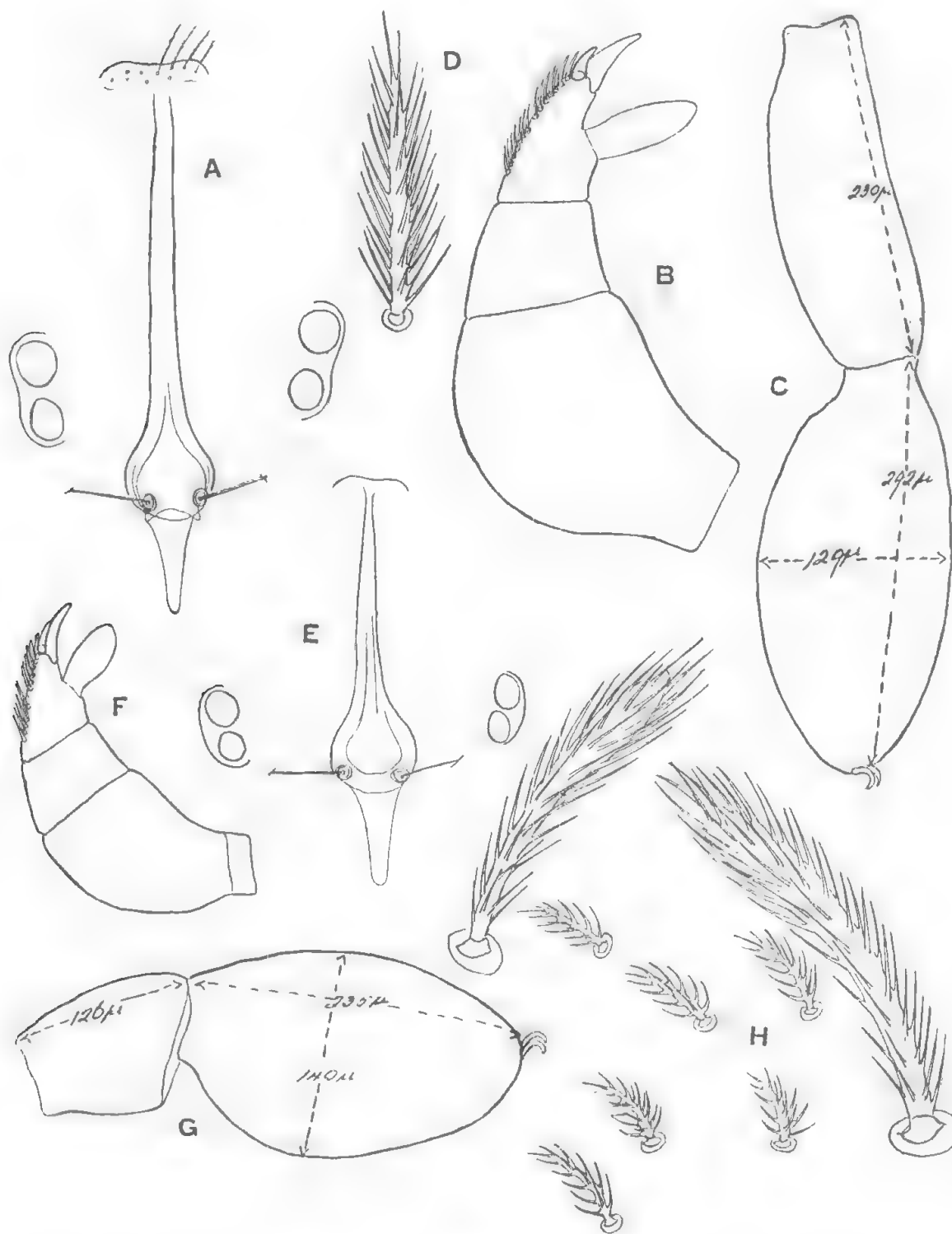


Fig. 14. A-D. *Microtrombidium affine* Hirst. A, Crista and eyes ( $\times 200$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 200$ ); D, dorsal seta ( $\times 860$ ). E-H. *Microtrombidium newmani* Wom. E, Crista and eyes ( $\times 200$ ); F, palp ( $\times 200$ ); G, front tarsus and metatarsus ( $\times 200$ ); H, dorsal setae ( $\times 860$ ).

setae of two kinds, the larger rather stout and rodlike with strong setules and to  $50\mu$  long, the smaller to  $20\mu$  long, more slender and tapering with long setules.

*Loc.* Two co-types from an ants' nest, Glen Osmond, S. Aust., 10th Sept., 1933 (H.W.). Other specimens from Glen Osmond, S. Aust., 17th Sept., 1933, 1st Oct., 1933, 29th July, 1934, Aug., 1935; Burnside, S. Aust., 17th Oct., 1934.

Also Julia Percy Is., New S. Wales, Feb., 1936 (A.T.) described as *M. tubbi*, and from Gympie, Queensland, 27th May, 1940 (D.J.W.S.), recorded as *Echin. hystricinum* Canest.

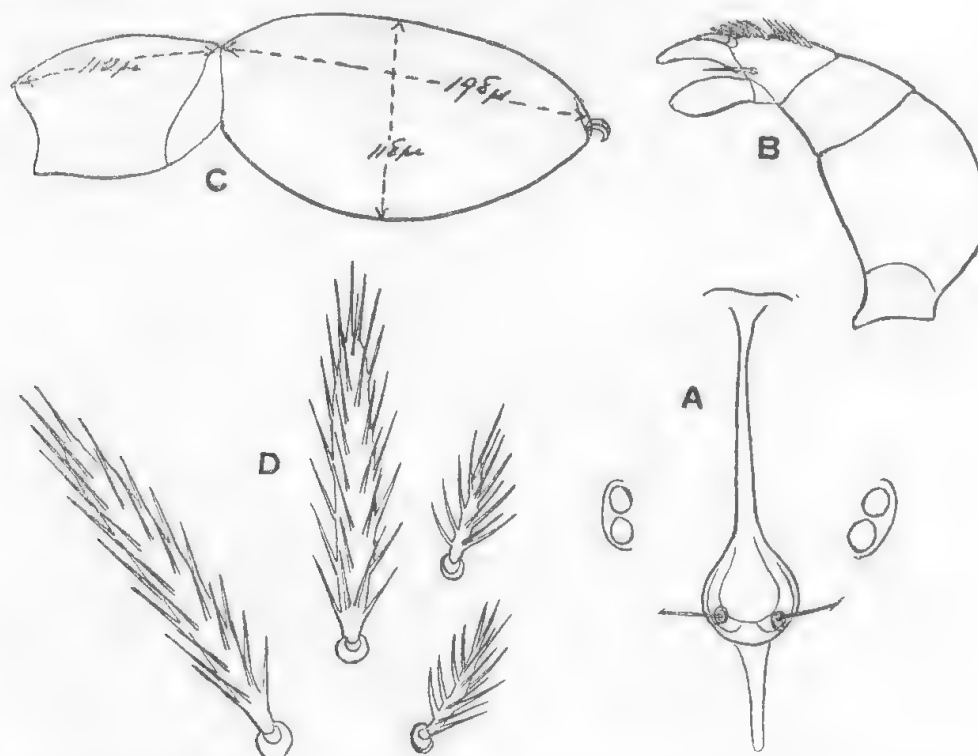


Fig. 15. *Microtrombidium adalaidicum* Wom. A, Crista and eyes ( $\times 200$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 200$ ); D, dorsal setae ( $\times 860$ ).

*Remarks.* From the clear figures of the dorsal setae of *hystricinum* given by Vitzthum (Treubia, 1928), the above species is superficially very close to the New Guinea form, and may be but a variation of it. The Australian specimens, however, differ in the very much shorter dorsal setae (see key) as well as in the slightly different proportions of the front tarsi and metatarsi; for the present I would regard them as a different species.

#### MICROTROMBIDIUM JABANICUM Berl.

*Microtrombidium pusillum* v. *jabanicum* Berlese, 1910, Redia, 6, 362.

*Microtrombidium jabanicum* Berl., 1912. Redia, 8, 139–140; Oudemans, 1922, Entom. Ber., 6, 108; Vitzthum, 1926, Treubia, 8 (1–2).

#### Fig. 16 A–E.

A single specimen collected from soil surface in kunai grass, Dobodura area of New Guinea by Fl./Lt. D. C. Swan is, I believe, referable to this species. The description of the specimen, an adult female, is as follows:

Length 1.2 mm., width 0.85 mm. Shape only slightly cordate. Colour a deep purplish-red or maroon. Crista linear,  $324\mu$  long, and tapering towards

apex, with a subposterior sensillary area at about  $\frac{2}{3}$  from apex, sensillae ?, the bases  $25\mu$  apart. Eyes 2+2, on well defined ocular shields, well in advance of sensillary area. Chelicerae with finely serrate inner edge. Palpi stout, tibia with apical claw, smaller accessory claw, two pectines and a short, stout, external spine. Legs shorter than body, I  $900\mu$ , II  $660\mu$ , III  $660\mu$ , IV  $900\mu$ ; tarsus I  $216\mu$  long by  $122\mu$  high,  $T_1/T_w = 1.77$ , metatarsus I  $144\mu$  long,  $T_1/M_1 = 1.5$ . Dorsal setae of uniform type, mainly stout with long setules and to  $20\mu$  long; on the propodosoma near crista and near the suture, as well as at the posterior end of hysterosoma they are somewhat longer, to  $25\mu$ .

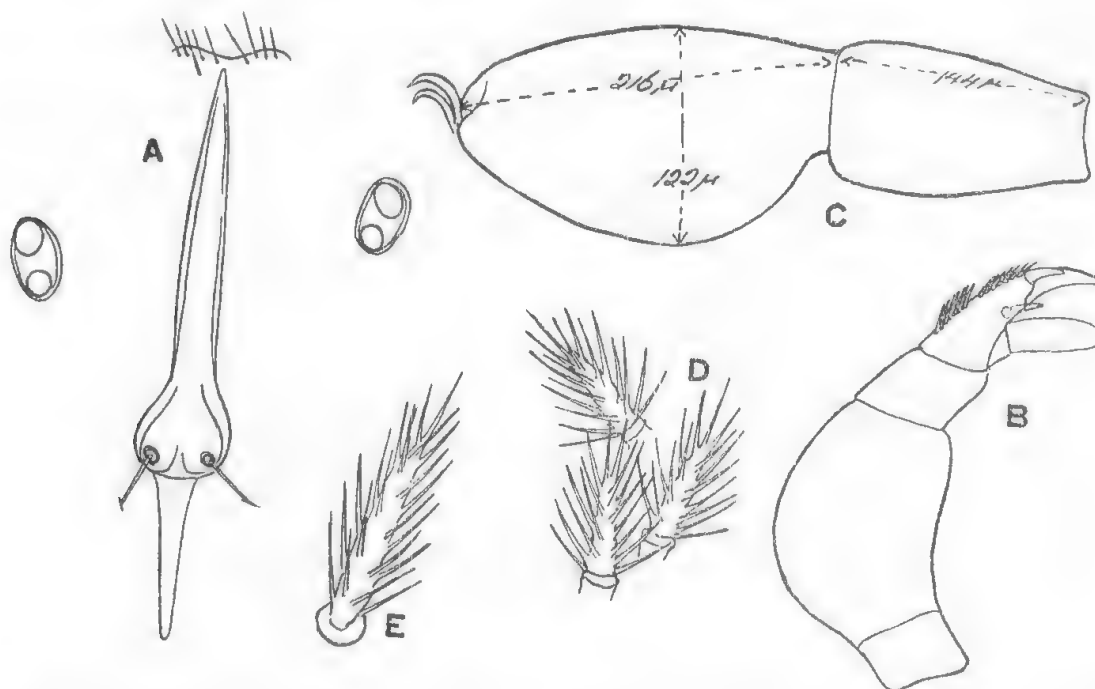


Fig. 16. *Microtrombidium jabanicum* Berl. A, Crista and eyes ( $\times 200$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 200$ ); D, dorsal setae from disc of hysterosoma ( $\times 860$ ); E, dorsal seta from propodosoma near crista ( $\times 860$ ).

*Loc.* Four females and three males from damp soil in typhus area, Goodenough Is., Aug., 1944 (D.C.S.).

*Remarks.* In the dimensions of the front tarsi and metatarsi this species is very near to *karriensis* but differs in that the clothing of the dorsum is very much denser, the setae are stouter, the colour of the animal is different and its form much broader across the shoulders in proportion to the length.

It may, possibly, be the same as *agilis* Canestrini from Finschhafen but the brief description of that species does not permit of comparison.

#### MICROTROMBIDIUM GOODENOUGHENSIS sp. nov.

##### Fig. 17 A-D.

*Description.* Adult. Length to 0.93 mm., width 0.63 mm. Colour in life red. Shape egg-like, somewhat broader across shoulders. Crista linear,  $260\mu$ , with subposterior sensillary area, at about  $\frac{3}{4}$  from apex, posterior arm evanescent, sensillae very long and filamentous, nude,  $216\mu$  long, bases  $40\mu$  apart. Eyes 2+2, on distinct shields and in advance of sensillary area, apex of crista with ca. 6 long finely ciliated setae. Chelae with finely serrate inner edge. Palpi



fairly stout, tibia with apical claw, smaller accessory claw, two pectines, but no external spine. Legs not longer than body, I to 900 $\mu$ , II 630 $\mu$ , III 630 $\mu$ , IV 930 $\mu$ ; tarsus I elongate, 240 $\mu$  long by 108 $\mu$  high,  $T_1/T_w = 2.22$ , metatarsus 144 $\mu$  long,  $T_1/M_1 = 1.66$ . Dorsal setae only moderately dense, 20 $\mu$ , uniform on both propodosoma and hysterosoma, fairly slender with long setules, pointed.

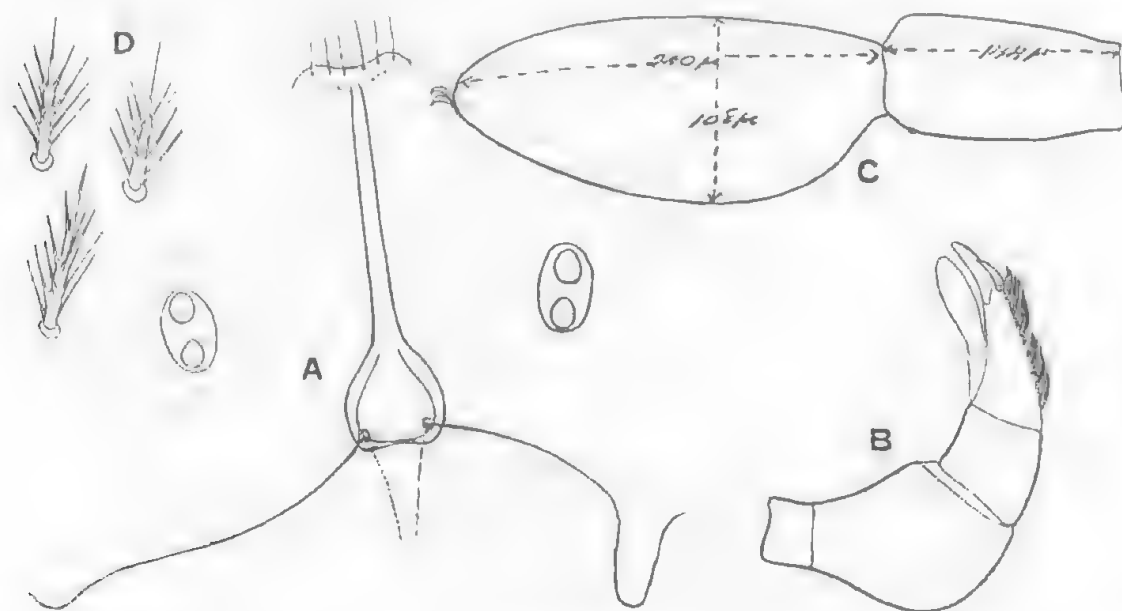


Fig. 17. *Microtrombidium goodenoughensis* sp. n. A, Crista and eyes ( $\times 200$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 200$ ); D, dorsal setae ( $\times 860$ ).

*Loc.* Two specimens in damp soil, Goodenough Is., Aug., 1944 (D.C.S.).

*Remarks.* In the form and length of the dorsal setae, and the absence of an external spine on the palpal tibia this species closely resembles *pusilla* Herm. from Europe. It differs, however, in the dimensions of the front tarsi and metatarsi.

#### MICROTROMBIDIUM CORDATUM sp. nov.

Fig. 18 A-F.

*Description.* Adult ♀. Shape cordate, relatively broad and short. Length to 1.65 mm., width across shoulders 1.2 mm. Colour a uniform deep purplish red or maroon. Crista linear, to 340 $\mu$  long, with subposterior sensillary area at about  $\frac{2}{3}$  from apex, anterior sinuous edge of evanescent anterior plate with numerous fine ciliated setae; sensillae long, 180 $\mu$ , apparently nude, the bases 29 $\mu$  apart. Eyes 2+2, on well developed ocular shields and well in advance of sensillary area. Chelicerae with finely serrate inner edge. Palpi not very stout, tibia with apical claw less than half its length, accessory claw, two pectines and a long slender external spine which arises much nearer the base of claw than the base of tarsus; tarsus elongate, barely reaching tip of claw. Legs shorter than body, I 900 $\mu$ , II 620 $\mu$ , III 620 $\mu$ , IV 870 $\mu$ ; tarsus I 223 $\mu$  long by 122 $\mu$  high,  $T_1/T_w = 1.83$ , metatarsus I 140 $\mu$  long,  $T_1/M_1 = 1.59$ . Dorsal setae very dense and strongly pigmented, 20 $\mu$ , uniform, fairly thick stemmed, with long setules (cf. fig. 18 E-F), those on the propodosoma and near suture and on apex of hysterosoma reaching to 30 $\mu$  long.

Adult ♂. Generally only differing in size. Length to 0.9 mm., width to 0.62 mm. Tarsus I  $151\mu$  long by  $86\mu$  high,  $T_1/T_w = 1.75$ , metatarsus I  $83\mu$  long,  $T_1/M_1 = 1.82$ . Otherwise as in female.

*Loc.* Four females and three males from damp soil in typhus area, Goodenough Is., New Guinea, Aug., 1944 (D.C.S.).

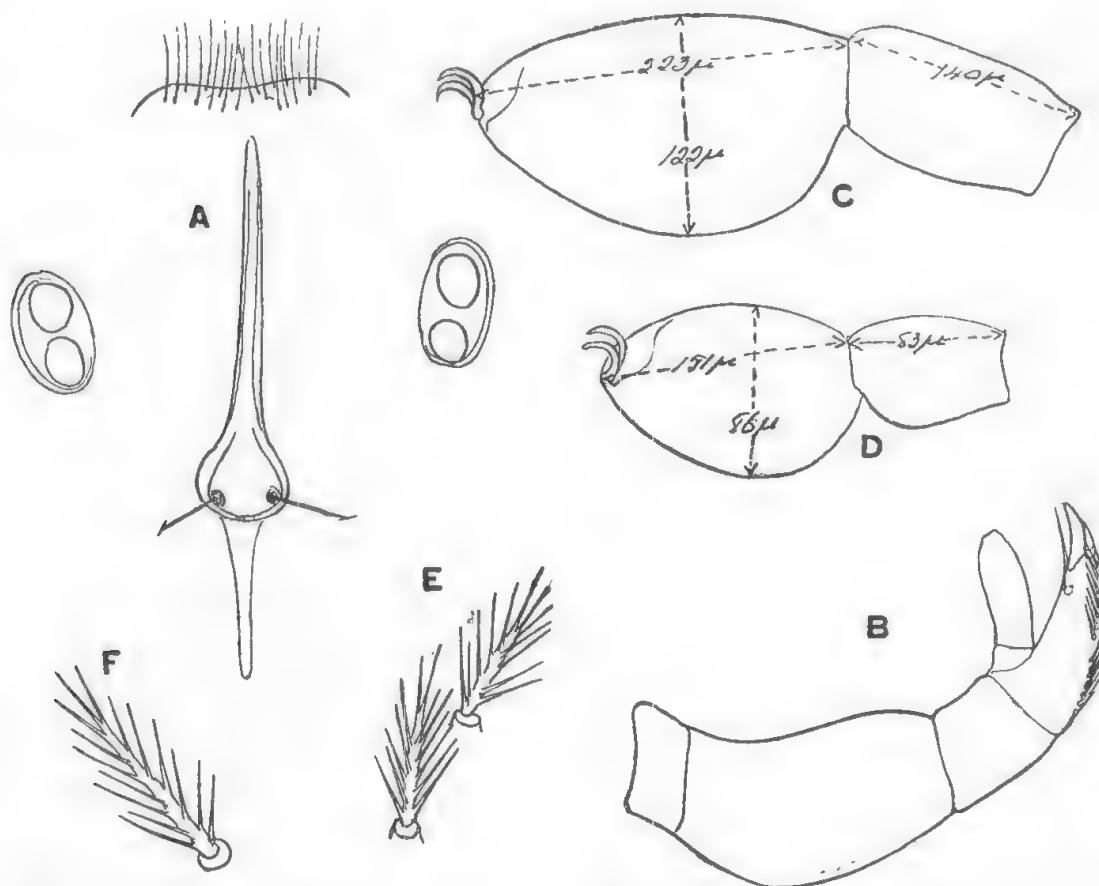


Fig. 18. *Microtrombidium cordatum* sp. n. A, Crista and eyes ( $\times 200$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus of female ( $\times 200$ ); D, same of male ( $\times 200$ ); E, setae from middle of dorsum ( $\times 860$ ); F, seta from propodosoma ( $\times 860$ ).

KEY TO THE ABOVE SPECIES OF *Microtrombidium* s.str.

1. Front tarsus more or less elongate, about twice or more than twice as long as high .. 2.  
Front tarsus distinctly less than twice as long as high .. .. 7.
2. Front tarsus more than 3 times as long as high .. .. 3.  
Front tarsus about twice or to  $2\frac{1}{2}$  times as long as high .. .. 4,
3. On external side of palpal tibia with two strong spines arising from near articulation of tarsus.  $T_1/T_w = 3.1$ ,  $T_1/M_1 = 1.54$ . Dorsal setae uniform to  $24\mu$ , tapering with long setules .. .. *zelandicum* Wom. 1936.  
On external side of palpal tibia with only one spine, this short and stout.  $T_1/T_w = 3.36$ .  $T_1/M_1 = 1.67$ . Dorsal setae of two distinct sizes,  $25\mu$  and  $50\mu$  thick, with long setules, the longer setae appearing clavate or bushy .. .. *myloriense* sp. nov.
4. No external spine on palpal tibia .. .. 5.  
One external spine of palpal tibia .. .. 6.
5. Front tarsus only slightly longer than metatarsus,  $T_1/M_1 = 1.27$ .  $T_1/T_w = 2.26$ . Dorsal setae uniform to  $40\mu$ , slightly tapering, with long setules .. .. *affine* Hirst 1928.  
Front tarsus about  $1\frac{1}{2}$  times as long as metatarsus,  $T_1/M_1 = 1.66$ ,  $T_1/T_w = 2.22$ . Dorsal setae uniform, to  $20\mu$  (near suture to  $36\mu$ ), tapering with long setules .. .. *goodenoughensis* sp. nov.

6. External spine of palpal tibia long and slender.  $T_1/T_w = 1.92$ ,  $T_1/M_1 = 1.57$ . Dorsal setae uniform to  $16\mu$ , tapering with long setules .. .. . cf. *aequalis* (Bks. 1916).  
External spine of palpal tibia thick.  $T_1/T_w = 2.12$ ,  $T_1/M_1 = 1.76$ . Dorsal setae uniform, slender and tapering, with long setules, varying from  $40\mu$  to  $80\mu$ , but without demarcation into two sizes .. .. . *wellingtonense* sp. nov.
7. Colour red, with eleven rounded white patches on dorsum. Front tarsus broadly ovate,  $T_1/T_w = 1.74$ ,  $T_1/M_1 = 1.62$ . Dorsal setae uniform, fairly thick stemmed, to  $25\mu$ , with long setules .. .. . *maculatum* Wom. 1942.  
Colour entirely red, or purplish red .. .. . 8.
8. Dorsal setae of two distinct lengths .. .. . 12.  
Dorsal setae uniform in length, or if increasing posteriorly, then not in two distinct sizes 9.
9. Front tarsus elongate oval, highest in the middle.  $T_1/T_w = 1.93$ ,  $T_1/M_1 = 1.5$ . External spine on palpal tibia long and strong. Dorsal setae very dense, uniformly long and slender,  $40-75\mu$ , with long setules .. .. . *hirsutum* sp. nov.  
Front tarsus relatively shorter and higher with the highest point nearer the base .. .. . 10.
10. External spine of palpal tibia short and stumpy.  $T_1/T_w = 1.76$ ,  $T_1/M_1 = 1.5$ . Dorsal setae thick, hardly tapering, with long setules, chiefly to  $20\mu$  long, but near crista and suture and on apex of hysterosoma to  $25\mu$  .. .. . *javanicum* Berl. 1910.  
External spine of palpal tibia long and slender .. .. . 11.
11. Smaller species, more elongate. Red. Tibial claw of palp almost as long as tibia, external tibial spine slender, arising near articulation of tarsus and reaching to middle of claw. Dorsal setae rather slender, uniform,  $25-30\mu$  long, occasionally to  $40\mu$ , with long outstanding setules.  $T_1/T_w = 1.7$  to  $2.31$  (aver.  $1.9$ ),  $T_1/M_1 = 1.73$  to  $2.25$  (aver.  $1.87$ ).  
*karriensis* Wom. 1931.  
Larger species, cordate. Purplish. Tibial claw of palp less than half as long as tibia, external spine arising near base of claw, long and slender, and almost reaching tip of claw. Dorsal setae stouter, uniform,  $20\mu$ , with long setules, those on suture and apex of hysterosoma reaching  $30\mu$ .  $T_1/T_w = 1.83$ ,  $T_1/M_1 = 1.59$ . .. .. . *cordatum* sp. nov.
12. The longer dorsal setae more clustered near apex of hysterosoma and not on disc, to  $32\mu$ ; smaller setae  $16\mu$ , rather thick, slightly curved and with short setules, longer setae more rod-like with short setules.  $T_1/T_w = 1.61$  to  $1.88$  (aver.  $1.72$ ),  $T_1/M_1 = 1.41$  to  $1.71$  (aver.  $1.55$ ) .. .. . *papuanum* sp. nov.
13. The longer dorsal setae to  $70\mu$  and distally split longitudinally for  $1/5$  to  $1/7$  of their length, with comparatively short setules. Shorter setae tapering,  $16-20\mu$  long, with relatively longer setules. Front tarsus rather less than twice as long as high —  $1.66$ , highest about the middle and  $1.66$  times as long as metatarsus. External spine of palpal tibia fine and slender .. .. . cf. *furciple* (Canest. 1897).  
The longer dorsal setae not thus split distally .. .. . 14.
14. Longer dorsal setae sparse, clavate or bushy distally, to  $80\mu$  long with long setules. Smaller setae tapering, to  $24\mu$  long, with curved setules. Front tarsus oval,  $T_1/T_w = 1.68$ , highest in middle,  $T_1/M_1 = 1.86$ . No external spine on palpal tibia .. .. . *newmanii* Wom. 1934.  
Longer dorsal setae not clavate .. .. . 15.
15. Longer dorsal setae to  $80\mu$ , the shorter to  $30\mu$ .  $T_1/T_w = 1.75$ ,  $T_1/M_1 = 1.6$ . Dorsal setae with relatively short setules (after Vitzthum) .. .. . *hystricinum* (Canest. 1897).  
Longer dorsal setae to  $50\mu$ , shorter to  $16-20\mu$ , with relatively short setules.  $T_1/T_w = 1.68$ ,  $T_1/M_1 = 1.77$ . External spine of palpal tibia slender .. .. . *adelaidicum* Wom. 1934 (= *tubbi* Wom. 1942).

#### Genus CAMEROTROMBIDIUM Sig Thor, 1936.

Zool. Anz. 1936, 114, 31.

*Microtrombidium* Boshell and Kerr, 1942 (in part) Rec. Ac. Columb. Ci. Ex., 5, 110-127.

This genus was erected by Sig Thor for those species of Microtrombidiinae in which the dorsal setae, or at least the larger setae where there are two sizes, are chambered and septate, but are not curved or bent over, as in the genus *Campylothrombium* Krause, 1916.

He cited *Trombidium pexatum* (C. L. Koch, 1937) (= *calceigerum* Berl., 1910) as the genotype and included the following species; *purpureum* (C. L.

Koch, 1837) (= *sanguineum* Berl., 1887, in part); *sanguineum* (C. L. Koch, 1837) (= Berl., 1887, in part) (= *subrasum*, Berl., 1910); *barbatum* (Lucas, 1849); *vesiculosum* (Sig Thor, 1900); *curtulum* (Berl., 1910); *diversum* (Berl., 1910); *clavodigitatum* (Berl., 1916); *hervillei* (André, 1932); *k.* var. *diversipalpis* (André, 1932); *collinum* (Hirst, 1928); *simile* (Hirst, 1928); *hirsti* (Womersley, 1934).

Later (Zool. Anz., 115 (3/4), 106) he described *C. globiferum* from Mauritius, and in the same paper cited *Ottonia vesiculosa* Sig Thor, 1900, as a new genotype of *Camerotrombidium* Sig Thor, 1936.

The following seven species are known to occur in Australia, two of which, and a variety, are here described as new.

#### CAMEROTROMBIDIUM SIMILE (Hirst, 1928).

*Microtrombidium* (*Euemotrombidium*) *simile* Hirst, 1928. P.Z.S. 1024, fig. 2. A.C.D.F.G.H.; Womersley, 1934. Rec. S. Aust. Mus., 5 (2), 195, *nec* Womersley, 1936, J. Linn. Soc. London (Zool.) 40, (269), 109.

*Microtrombidium* (*Euemotrombidium*) *hirsti* Womersley, 1934, Rec. S. Aust. Mus., 5 (2), 196, fig. 46-47.

*Camerotrombidium simile* Sig Thor, 1936, Zool. Anz., 114, 31; Womersley, 1937, Rec. S. Aust. Mus., 6 (1), 92.

*Camerotrombidium hirsti* (Womersley 1934), Sig Thor, 1936, Zool. Anz., 114, 31; Womersley, 1937, Rec. S. Aust. Mus., 6 (1), 92.

#### Fig. 19 A-K and 20 A-E.

Redescription of Adult. Fig. 19 A-K. Shape as in outline fig. 19A, hysterosoma roughly oblong, wider anteriorly across the rounded shoulders, posteriorly rounded; propodosoma somewhat triangular, basally much narrower than anterior margin of hysterosoma into which it is slightly sunken and from which it is separated by a transverse posteriorly concave sulcus. Colour entirely red but with a light whitish dusting, especially on the legs, due to the setae. Length to 2.71 mm., width across shoulders to 1.46 mm. Crista, Fig. 19B, elongate but moderately broad and tapering anteriorly, with subposterior sensillary area at about  $\frac{2}{3}$  from apex, length to 600 $\mu$ , sensillary bases 54 $\mu$  apart, sensillae ca. 200 $\mu$  long, filamentous, apparently nude. Eyes 2+2, on well developed ocular shields, posterior eyes the smaller. Legs all shorter than the body, I 2175 $\mu$ , II 1380 $\mu$ , III 1350 $\mu$ , IV 2250 $\mu$ ; tarsus I (Fig. 19D) elongate oval to 450 $\mu$  long by 180 $\mu$  high = 2.5 ratio, metatarsus I to 345 $\mu$  long, ratio length of tarsus to metatarsus = 1.3. Palpi, Fig. 19C, stout, tibia with stout apical claw and smaller stout accessory claw, two pectines, and on external side with 2-4 stout strong spines arising near base of palpal tarsus (Hirst says 2 to 3 spines, but the number is variable, even in the same specimen and sometimes one may be more slender); tarsus elongate, hardly clavate and only very slightly exceeding tip of tibial claw.

Clothing dorsally on propodosoma mainly and on hysterosoma entirely of two forms and sizes; the larger, Fig. 19 E-F, to 50 $\mu$  long, globose or subglobose, thistle-like with a distinct chamber marked off by a septum, apically above the septum open and with a distinct whorl of setules, otherwise evenly with long ciliations, arising from a rosette-like tubule; the smaller cup-shaped (Fig. 19 G), 18-20 $\mu$  long, arising from a rosette-like tubule, with fine ciliations and in some views showing distinctly the lateral margins of the scale which is apparently curled to form the cup (see Fig. 19 G); on the propodosoma laterally above the anterior pairs of coxae are a number of small, 21 $\mu$ , ciliated, pointed setae (Fig. 19 H), which dorsally appear fusiform, but ventrally show distinctly a clear space and the

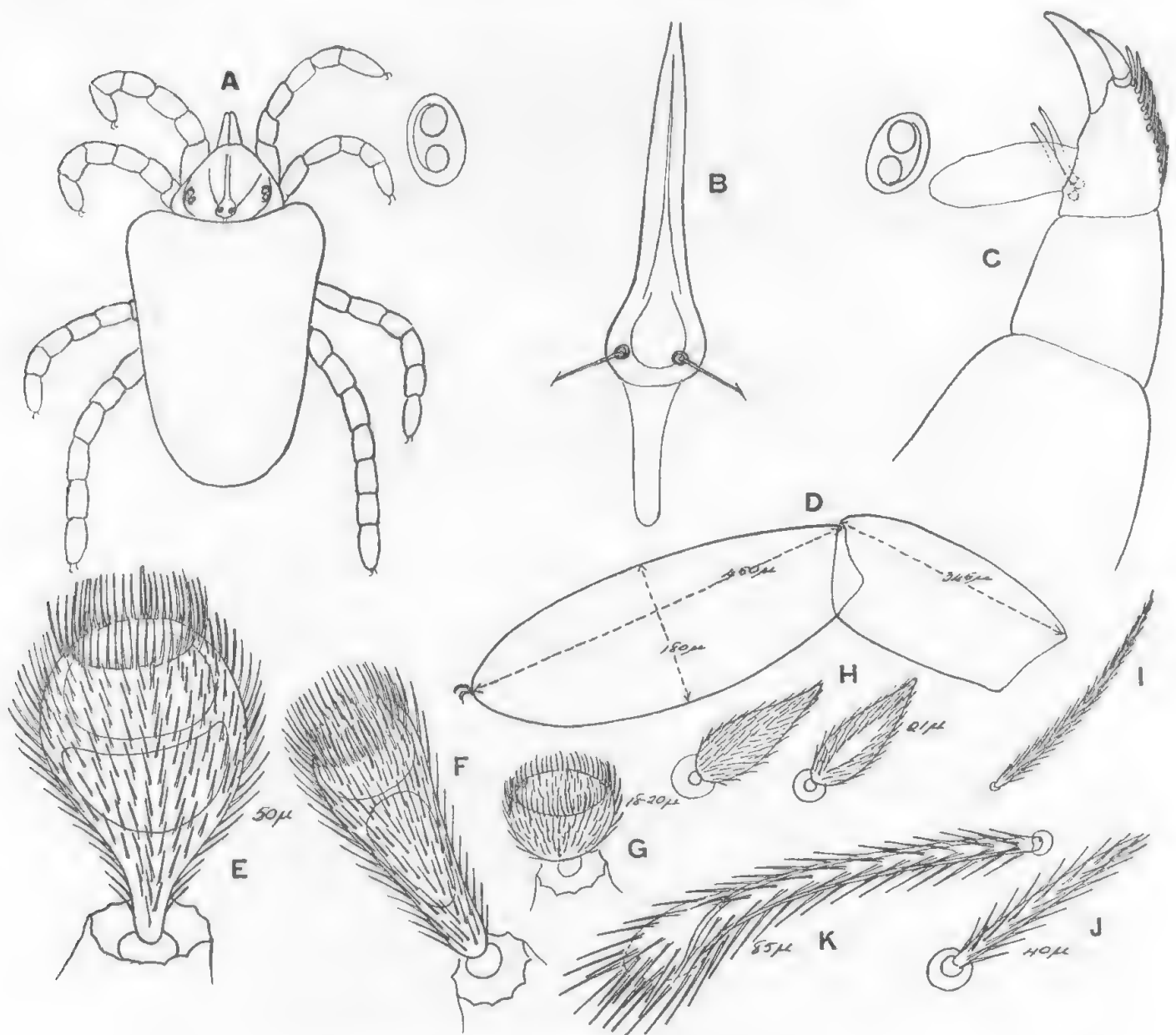


Fig. 19. *Camerotrombidium simile* (Hirst) adult. A, Dorsal view in outline; B, crista and eyes ( $\times 125$ ); C, palp ( $\times 200$ ); D, front tarsus and metatarsus ( $\times 125$ ); E, large seta from apex of hysterosoma; F, same from anterior of hysterosoma; G, small seta from hysterosoma; H, dorsal and ventral views of small setae from lateral areas of propodosoma; I, seta from in front of apex of crista; J, ventral setae from anterior of genital organ; K, seta from basal segments of legs (E to K  $\times 860$ ).

edges of the longitudinally curled scale of which they are formed; the larger septate setae (Fig. 19 F), anteriorly on the propodosoma, are more elongate and not so globose as elsewhere; at the apex of the propodosoma in front of the tip of the crista is a fringe of long pointed slender ciliated setae (Fig. 19 I); ventrally from between the genital and anal openings the setae are of two kinds as on the hysterosoma, anteriorly they are long, fairly stout, ciliated (Fig. 19 J) to  $40\mu$ , and gradually becoming smaller towards the genital opening where they resemble Fig. 19 H; the legs dorsally and dorsolaterally on all segments, and the palpal femora are furnished with somewhat clavate, ciliated setae, which on the basal leg segments reach to  $85\mu$  in length (Fig. 19 K), but elsewhere are shorter; otherwise the appendages with long fine slender ciliated setae.

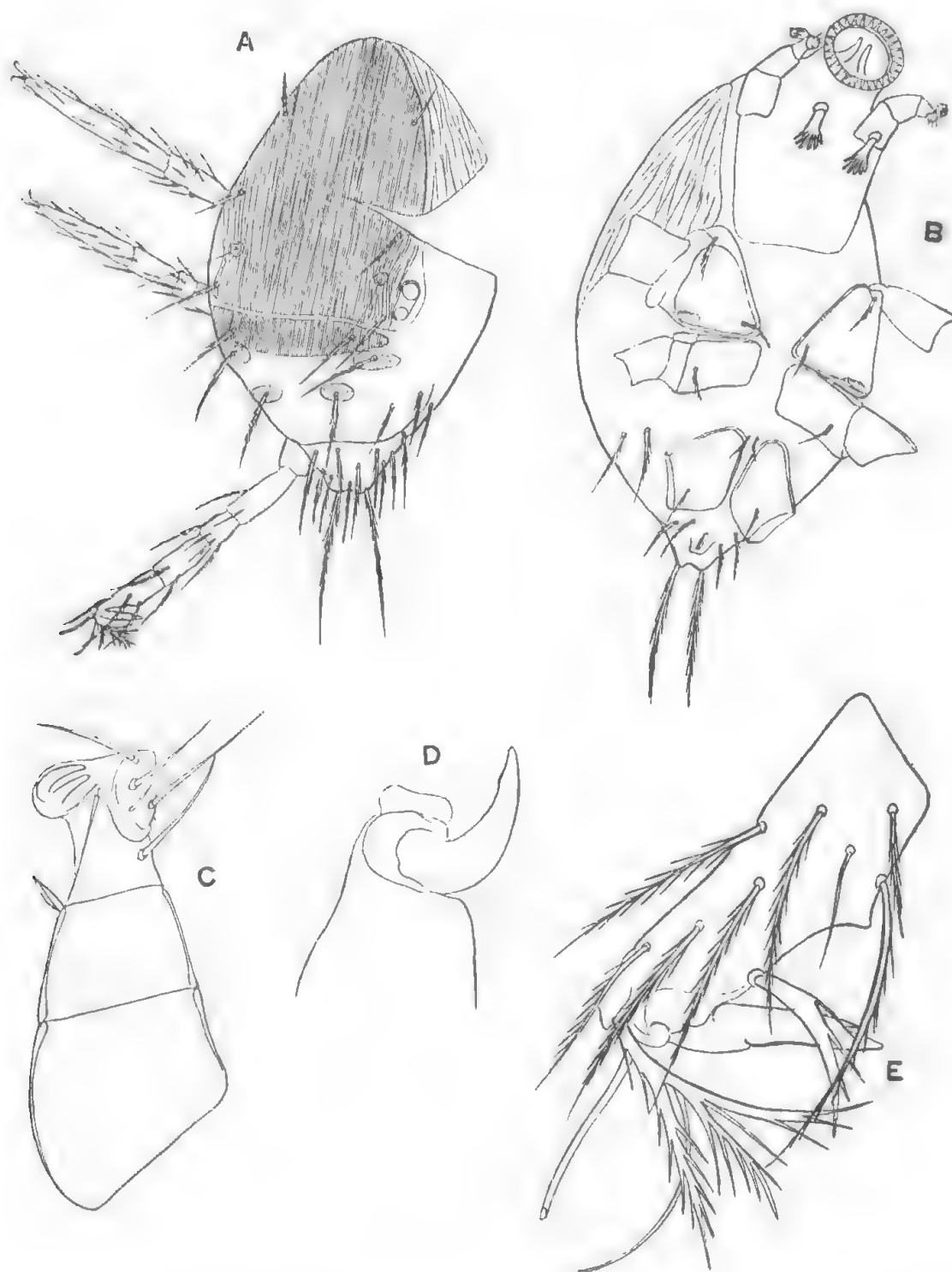


Fig. 20. *Camerotrombidium simile* (Hirst) larva. A, dorso-lateral view; B, ventro-lateral view; C, palp; D, chelicera; E, tarsus of leg III.



*Loc.* Type material (in S. Aust. Museum) from Belair, S. Aust., Jan. 1, 1928 (S. Hirst); other specimens from South Australia: Sou'-West River, Kangaroo Is., Dec., 1934 (H.W.), (3 spec.); Wood's Point, May, 1935 (H.W.), (1 spec.); Mt. Gambier, Jan., 1941 (J.S.W.), (1 spec.); Coorong, April, 1943 (H.W.), (a number); Robe, Oct., 1943 (H.W.), (1 spec.). New South Wales: Myall Lakes, Sept., 1922 (A. Musgrave), (1 spec.).

*Remarks.* The specimen from New South Wales was amongst the Hirst material left in Adelaide and was that from which *C. hirsti* (Wom., 1934) was described. I am now satisfied, however, that the specimen does not differ essentially from typical *simile* Hirst.

*Description of Larvae.* Fig. 20 A-E. Colour in life reddish. Shape rather ovoid, tapering posteriorly and apex incised, higher than wide. Length to  $300\mu$ , width to  $165\mu$ . Legs shorter than body, I  $270\mu$ , II  $225\mu$ , III  $240\mu$ . Dorsally with two anterior median scuta, the anterior very large,  $184\mu$  long by  $128\mu$  wide, longitudinally striated, occupying nearly the whole width of dorsum and extending backwards to level of between first and second coxae, anteriorly it overlaps on to the venter and this portion has the longitudinal striae much wider apart (cf. Fig. 20 A-B); this scutum has 3 pairs of short stout setae,  $32-40\mu$  long and ciliated, as well as a pair of long filamentous sensillae,  $72\mu$  long, and with bases  $105\mu$  apart; the second scutum is transverse, as wide as the first, but only  $34\mu$  long, with two setae,  $40\mu$  long, and ciliated. Eyes 2+2, the anterior eyes on a level with sensillae. Behind the second anterior scutum are four strong ciliated setae, about  $50\mu$  long, set in the centre of small pitted oval plates, these are followed by about 16 setae of which the last pair are  $80\mu$  long. Mandibles long, with the chelae as in Fig. 20 D. Palpi apparently 4-segmented, stout, tarsus short and rounded with 3 long and 1 short simple setae, tibia with curved hook-like claw, which appears almost bifurcate. The oral opening is circular, formed of a pair of semicircular lobes set with teeth (in the figure 20 B, the lobes have become displaced and only one is seen). Ventrally, gnathosoma with a pair of short stout fimbriated setae, coxae I and II forming two lateral groups, separated in medial line, III practically touching medially, I with two pairs of short ciliated, tapering setae, II and III with 1 pair; no setae between coxae I or II, but a pair of short setae between coxae III at anterior corners. Tarsi and claws of legs I and II normal, those of III with the outer claw deformed as in Fig. 20 E.

*Loc.* Several larvae were found during Oct. 1943 in a tube in which an adult, collected from the Coorong, S. Aust., April, 1943, had been confined with a small amount of sterilized soil. No eggs were seen. Two specimens were mounted.

*Remarks.* In the form of the mouth parts, dorsal scuta and the third tarsus this species agrees with those placed by Oudemans (1912) as of the genus *Thrombidium* Fabr., 1775. Of the species so placed by Oudemans, however, none are known from the adult forms, and indeed he states on p. 112, that they are only provisionally placed in *Thrombidium*.

In the two species, which Oudemans figures, viz. *demeijerei* Ouds. and *africanum* Ouds. the third pair of coxae are distinctly and widely separated. Assuming this difference to be valid the larval generic diagnosis of *Camerotrombidium* may be stated as follows:

Trombidiidae with the characteristic pseudostigmal opening between coxae I and II. Eyes 2+2. Two median dorsal scutum, anterior with 3 pairs of setae and 1 pair of sensillae, anteriorly overlapping on to venter; posterior with 2 setae; both longitudinally striated. Coxae I and II touching, separated in medial line, III touching more or less completely in median line. Oral opening circular. Palpal tibia with hook-like claw. Outer claw of tarsus III deformed.



*CAMEROTROMBIDIUM COLLINUM* (Hirst, 1928).

*Microtrombidium* (*Encemotrombidium*) *collinum* Hirst, 1928. Ann. Mag. Nat. Hist. (10), 1, 565; Womersley, 1934. Rec. S. Aust. Mus. 5, (2), 195.

*Camerotrombidium collinum* Sig Thor, 1936, Zool. Anz., 114, 31; Womersley, 1937. Rec. S. Aust. Mus., 6 (1), 92.

## Fig. 21 A-F.

Redescription. Colour red. Shape as in *C. simile* Hirst, with a distinct posteriorly convex sulcus between propodosoma and hysterosoma. Length 1.31 mm., width across shoulders 0.85 mm. Crista linear, fairly stout, 320 $\mu$  long, anteriorly tapering, with subposterior sensillary area at about  $\frac{2}{3}$  from apex,

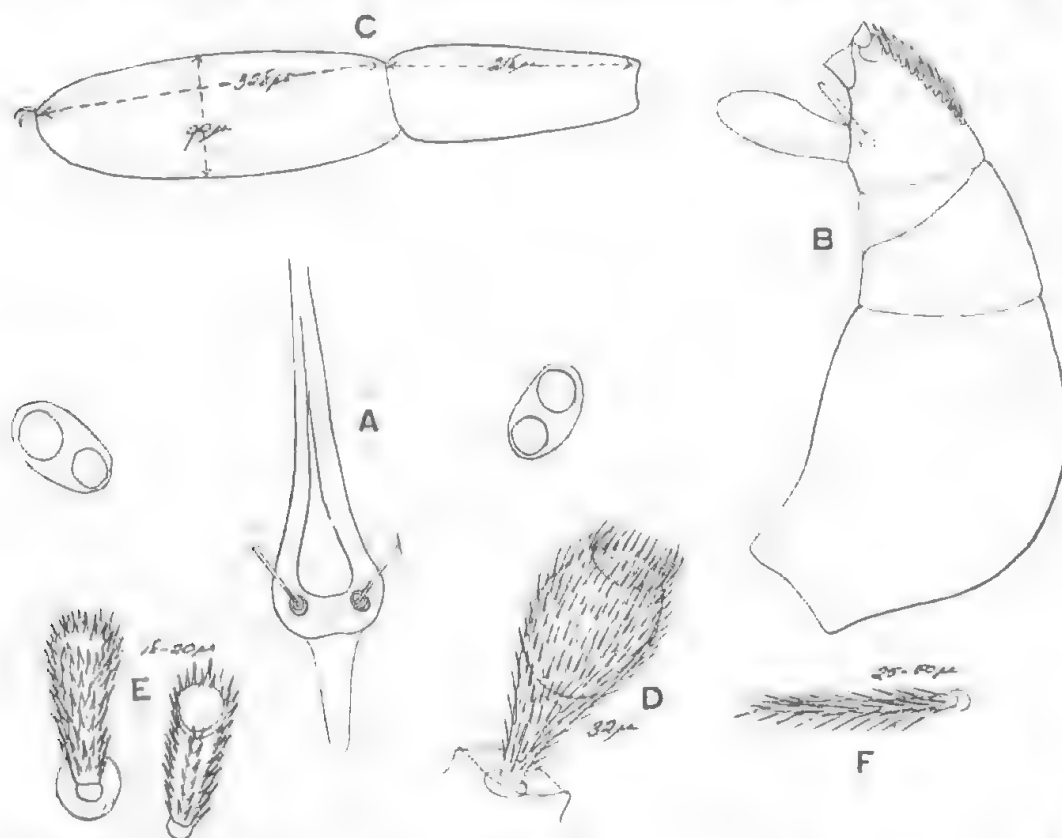


Fig. 21. *Camerotrombidium collinum* (Hirst). A, Crista and eyes ( $\times 170$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 125$ ); D, larger dorsal seta ( $\times 860$ ); E, smaller dorsal setae ( $\times 860$ ); F, seta from edge of propodosoma and venter ( $\times 860$ ).

sensillae bases 36 $\mu$  apart, sensillae ? Eyes 2+2, on well defined ocular shields, sessile, posterior eyes the smaller. Legs all shorter than body, I 1300 $\mu$ , II 820 $\mu$ , III ?, IV 1300 $\mu$ , tarsi I elongate, 328 $\mu$  long by 90 $\mu$  high = 3.6 ratio, metatarsus I 218 $\mu$  long, ratio length of tarsus to metatarsus = 1.5. Palpi (Fig. 21 B) stout, with stout tibial claw and smaller but stout accessory claw, two pectines and on external sides with a single stout spine arising near base of palpal tarsus; palpal tarsus elongate and slightly clavate.

Clothing dorsally of two kinds, the larger somewhat globose, septate, ciliated and with an oral whorl (Fig. 21 D), length to 32 $\mu$ , smaller setae rather stout, 18-20 $\mu$  long, slightly swollen apically with an oral opening seen ventrally, and furnished with strong spicules (Fig. 21 E); on the propodosoma the latter setae

are replaced, especially laterally, with stout, tapering, rod-like, ciliated setae (Fig. 21 F) which are about  $25\mu$  long, similar but longer setae occur on the apex of propodosoma in front of apex of crista and also compose most of the ventral clothing. The legs dorsally with setae as in *C. simile* (Fig. 19 K) and of varying lengths, otherwise with setae much as in Fig. 20 F.

*Loc.* Tanunda, South Australia, 23rd March, 1927 (S.H.), (the type).

*Remarks.* The above redescription and figures are from the type specimen in the South Australian Museum Collection. As shown in the figures the specimen is incomplete in some details, especially the palp.

*CAMEROTROMBIDIUM WYANDRAE* (Hirst, 1928).

*Microtrombidium (Enemotrombidium) wyandrac* Hirst, 1928. Ann. Mag. Nat. Hist. (10), 1, 565; Womersley, 1934. Rec. S. Aust. Mus., 5 (2), 195.

*Camerotrombidium wyandrac* Womersley, 1937. Rec. S. Aust. Mus., 6 (1), 92. Fig. 22 A-H.

*Redescription.* Colour red. Shape as in *C. simile* Hirst, with a distinct posteriorly convex sulcus between propodosoma and hysterosoma. Length 2.7 mm., width across shoulders 1.5 mm. Crista linear,  $600\mu$  long, only moderately stout with subposterior sensillary area at about  $\frac{2}{3}$  from apex, sensillae bases  $50\mu$  apart,

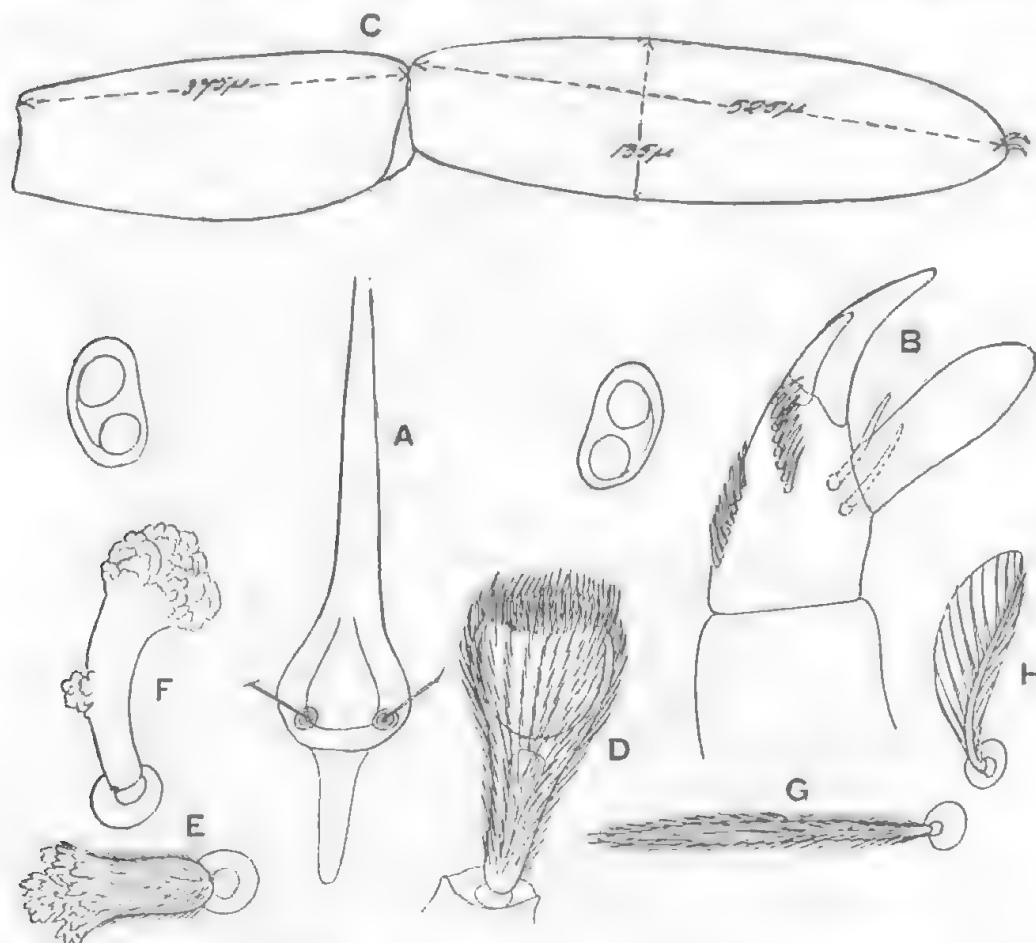


Fig. 22. *Camerotrombidium wyandrac* (Hirst). A, Crista and eyes ( $\times 100$ ); B, palpal tibia and tarsus ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 125$ ); D, larger dorsal seta ( $\times 860$ ); E, smaller seta from middle of dorsum; F, smaller seta from posterior margin; G, seta from lateral area of propodosoma and venter; H, seta from dorsal surface of leg segments (E to H  $\times 860$ ).

sensillae ? Eyes 2+2, on well developed sessile ocular shields, anterior of sensillary area, posterior eyes the smaller. Legs shorter than body, I 2225 $\mu$ , II 1450 $\mu$ , III 1500 $\mu$ , IV 2400 $\mu$ , tarsus I elongate, parallel sided, 525 $\mu$  long by 135 $\mu$  high = 4.0 ratio, metatarsus 375 $\mu$  long, length of tarsus to metatarsus = 1.4. Palpi as in Fig. 22 B, stout, tibia with strong apical and accessory claws, two pectines and two strong spines arising near base of tarsus on external side; tarsus elongate, only indistinctly clavate, and reaching tip of claw.

Clothing dorsally on hysterosoma of two kinds and sizes; the larger setae, 48–50 $\mu$  long, are globose or thistle-like, septate (Fig. 22 D), ciliated, with an oral whorl; the smaller setae, mainly stout, rod-like, on the stem with spicules and apically expanded into a more or less tri-lobed head, the lobes of which are tubercular, on the body margin becoming curved, with a secondary tubercular lobe about the middle, and reaching a length of ca. 40 $\mu$ ; on the propodosoma, the setae are similar to the hysterosoma except laterally, where the smaller setae merge into ciliated rod-like setae as in Fig. 19 G, ca. 50 $\mu$  long; apex of propodosoma with a fringe of long ciliated setae, ca. 70 $\mu$  long; legs and palp with leaf-like ciliated setae dorsally as in Fig. 19 H; ventrally the setae are mainly short to long, rod-like and ciliated, only laterally are they of the two dorsal forms.

*Loc.* Wyandra, Queensland, July, 1927 (S.H.).

*Remarks.* The above redescription and figures are from the unique type in the South Australian Museum collection.

#### CAMEROTROMBIDIUM OPULENTUM sp. nov.

Fig. 23 A–F.

*Description.* Length to 2.7 mm., width across shoulders to 1.7 mm. Colour uniformly red. Shape as in *C. simile* (Hirst), with the usual posteriorly convex sulcus between propodosoma and hysterosoma. Crista to 630 $\mu$  long, linear, rather thick, tapering anteriorly, with subposterior sensillary area at about  $\frac{2}{3}$  from apex, sensillae bases 50 $\mu$  apart, sensillae ca. 150 $\mu$  long, apparently nude. Eyes 2+2, on well developed sessile ocular shields, anterior of sensillary area, posterior eyes the smaller. Legs all shorter than the body, I to 1650 $\mu$ , II to 1350 $\mu$ , III to 1350 $\mu$ , IV to 1800 $\mu$ ; tarsus I to 350 $\mu$  long by 130 $\mu$  high = ratio 2.7, metatarsus I to 290 $\mu$  long, giving a ratio of length of tarsus to metatarsus of 1.21. Palpi stout, tibia with apical stout claw and smaller accessory claw, two pectines and on external side arising from near base of tarsus a pair of stout spines; palpal tarsus elongate, scarcely clavate and only slightly over-reaching tip of claw.

Clothing dorsally of two kinds and lengths of setae, the larger as in Fig. 23 D clavate, septate and strongly ciliated, to 50 $\mu$  long; the smaller rod-like, Fig. 23 E, to 40 $\mu$  long, and blunt ended; near shoulders and laterally on propodosoma the latter type of setae are more tapering, in front of crista on apex of propodosoma with a fringe of long fine ciliated setae to 150 $\mu$  in length; ventrally entirely with long rod-like, to 40 $\mu$  (Fig. 23 F), ciliated setae; legs and palpi without any specialized setae.

*Loc.* Four specimens from under fallen boughs, Coorong, South Australia, 5th May, 1943 (H.W.).

*Remarks.* A very distinctive species in the nature of the dorsal setae. The size of the four specimens, which judging by the three pairs of genital discs are all fully adult, varies considerably, as also do the dimensions of the front tarsi and metatarsi. The measurements are as follows:

Specimen 2.7 mm. long, 1.7 mm. wide; tarsus I 350 $\mu$  long by 130 $\mu$  high, metatarsus I 290 $\mu$  long.

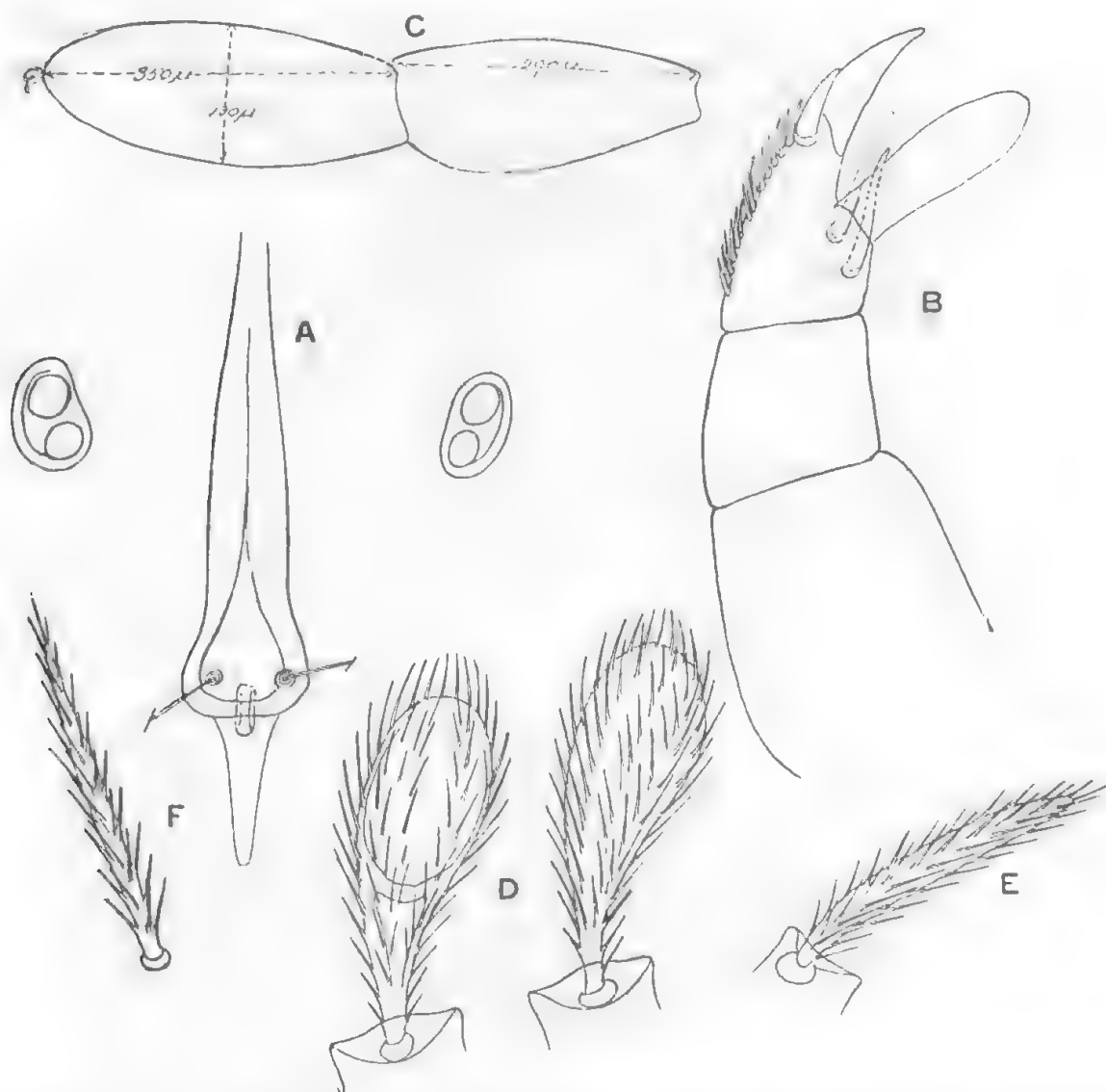


Fig. 23. *Camerotrombidium opulentum* sp. n. A, Crista and eyes ( $\times 125$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 125$ ); D, dorsal and ventral view of dorsal seta ( $\times 860$ ); E, smaller dorsal setae ( $\times 860$ ); F, seta from anterior and lateral ventral areas of propodosoma ( $\times 860$ ).

Specimen 1.5 mm. long, 1.0 mm. wide; tarsus I  $290\mu$  long by  $118\mu$  high, metatarsus I  $230\mu$  long.

Specimen 1.05 mm. long, 0.75 mm. wide; tarsus I  $210\mu$  long by  $75\mu$  high, metatarsus I  $150\mu$  long.

Specimen damaged, —; tarsus I  $240\mu$  long by  $90\mu$  high, metatarsus I  $180\mu$  long.

It is possible that the last two specimens may be of the male sex.

#### CAMEROTROMBIDIUM VAGINATUM sp. nov.

##### Fig. 24 A-G.

**Description.** Colour entirely red. Shape as in *C. simile* (Hirst) with the usual posteriorly convex sulcus between propodosoma and hysterosoma. Length ca. 1.5 mm., width ca. 1.05 mm. across shoulders. Crista linear, not very thick,  $450\mu$  long, with subposterior sensillary area at about  $\frac{2}{3}$  from apex, sensillae bases  $40\mu$  apart, sensillae ca.  $180\mu$  long, apparently nude. Eyes 2+2, on very slightly

pedunculate, well developed ocular shields, almost on a level with apex of crista, posterior eyes the smaller. Legs not longer than the body, fairly stout, I 1420 $\mu$  long, II 775 $\mu$ , III 775 $\mu$ , IV 1500, tarsus I elliptical as figured, 330 $\mu$  long by 150 $\mu$  high — ratio of 2.0, broadest at about  $\frac{2}{3}$ , metatarsus I 240 $\mu$  long, ratio of length

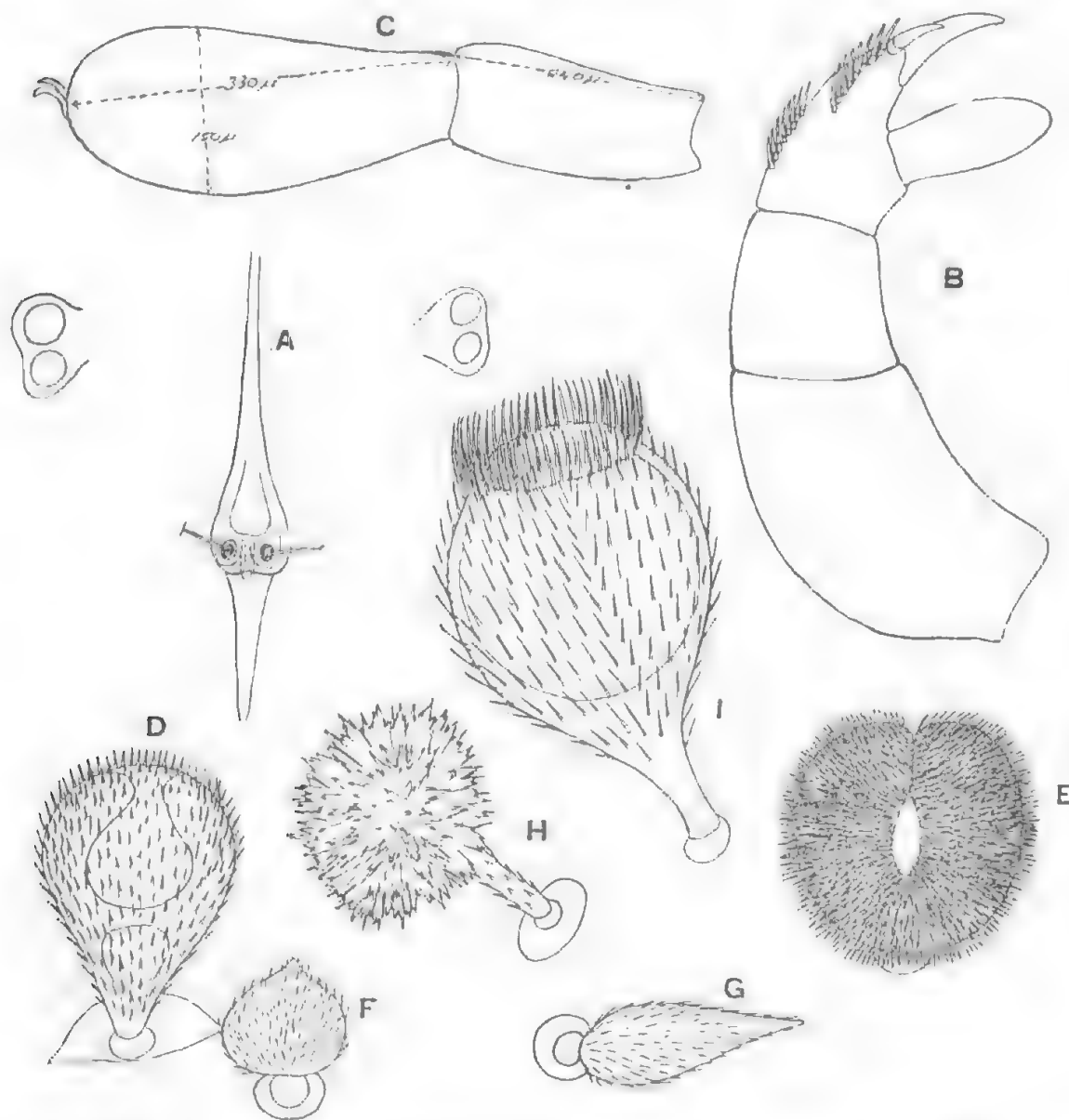


Fig. 24. A-G. *Camerotrombidium vaginatum* sp. n. A, Crista and eyes ( $\times 125$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 125$ ); D, larger dorsal seta viewed from side; E, same seen from above; F, small dorsal setae; G, same from lateral areas of propodosoma (D to G  $\times 860$ ). H-I. *Camerotrombidium cardium* sp. n. adult. H, Smaller dorsal seta ( $\times 860$ ); I, larger dorsal seta ( $\times 860$ ).

of tarsus to metatarsus — 1.4. Palpi only moderately stout, tibia with strong apical claw and accessory claw, two pectines, but without external spines; tarsus elongate, only slightly overreaching tip of tibial claw.

Clothing both ventrally and dorsally of two kinds and sizes: the larger to 40 $\mu$  long are globose, densely furnished with short strong spinules, septate, with only small oral opening and apparently formed of an inwardly curved scale (see

Fig. 24 D, E); the smaller setae are broadly fusiform, apically slightly pointed, finely ciliated and up to  $16\mu$  long, on the propodosoma laterally the latter setae become more elongate and reach  $40\mu$  in length (Fig. 24 G), the palpal femur and legs dorsally are furnished with foliate ciliated setae as in *C. wyandrae*.

*Loc.* A single specimen from Flinders Chase, Kangaroo Is., South Australia, Dec., 1934 (H.W.).

Remarks. Differs from other species in the form of the dorsal setae.

CAMEROTROMBIDIUM CARDUUM sp. nov.

Fig. 24 H-I.

Description. Clothing dorsally of two kinds and sizes of setae; the larger globose and thistle-like (Fig. 24 I) with a basal septa, a strong whorl orally of long ciliations, and with longitudinal rows of long strong spicules,  $50-70\mu$  in length; smaller setae,  $40\mu$  in length, with a large irregular head of strong but short spicules as in Fig. 24 H.

*Loc.* A single specimen from Mundaring, Western Australia, Feb., 1931 (H.W.).

Remarks. Of this specimen only portions of the dorsal cuticle are now extant, but the two forms of setae are so distinct from other species, that one ventures to describe it briefly as a new species.

CAMEROTROMBIDIUM RASUM (Berl., 1910).

*Microtrombidium (Enemothrombium) rasum* Berl., 1910. Redia, 6, (2), 361; *idem* 1912, Redia, 8 (1), 189. Fig. 89.

ROBENSIS var. nov.

Fig. 25 A-E.

Description. Adult. Shape as in *C. simile*, with a distinct posteriorly convex suture between propodosoma and hysterosoma. Colour in life red. Length to 1.8 mm., width to 1.2 mm. Crista linear, to  $420\mu$  long with subposterior sensillary area at about  $\frac{2}{3}$  from apex, sensillae ca.  $150\mu$  long, filamentous and apparently nude with bases  $50\mu$  apart. Eyes 2+2, on well defined sessile ocular shields. All legs except IV shorter than body, I  $1650\mu$ , II  $1260\mu$ , III  $1080\mu$ , IV  $2000\mu$ , tarsi I elongate oval,  $360\mu$  long by  $160\mu$  high = ratio of 3.11, metatarsus I  $280\mu$  long, ratio of length of tarsus to metatarsus = 1.28. Palpi as in Fig. 25 B, stout, tibia with stout apical and accessory claws, two pectines and a single strong, fairly stout external spine arising near base of tarsus; tarsus slightly clavate and slightly exceeding tip of tibial claw.

Dorsally setae uniform, small and globose, with apical opening and fringe of ciliations, otherwise uniformly ciliated,  $24\mu$  long, and arising from a rosette-like peduncle of about the same height; when carefully examined from below these setae are seen to be formed of a scale in which the lateral margins have been folded to form the globose cup-like head (see Fig. 25 D); near the apex and sides of the propodosoma are some longer,  $40\mu$ , ciliated setae as in Fig. 25 E.

*Loc.* Type and one paratype from under log at Robe, South Australia, April and Oct., 1943 (H.W.). Another specimen from Flinders Chase, Kangaroo Island, S. Australia, 6th Dec., 1934 (H.W.).

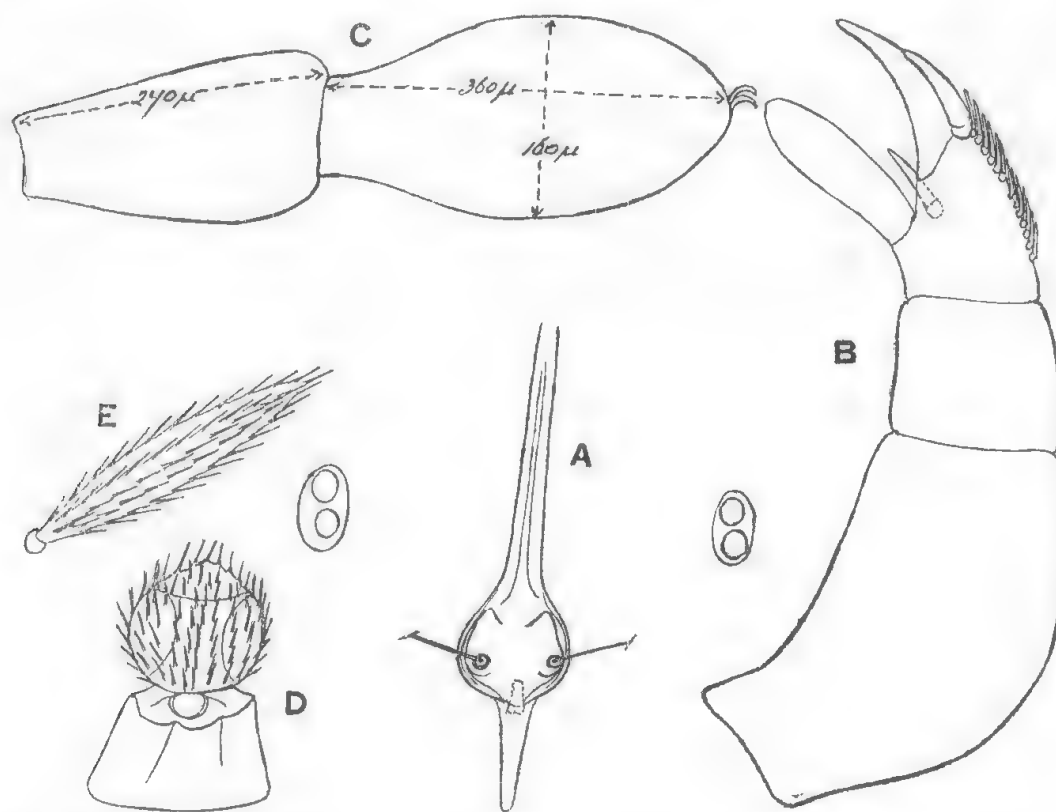


Fig. 25. *Camerotrombidium rasum* (Berl.) var. *robensis* nov. A, Crista and eyes ( $\times 125$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 125$ ); D, dorsal seta ( $\times 860$ ); E, seta from near apex and sides of propodosoma ( $\times 860$ ).

Remarks. The above specimens are in complete agreement with Berlese's description and figures (1912) of *rasum* from Germany, in the form of the dorsal setae and the size and dimensions of the front tarsi and metatarsi. They differ, however, in the presence of an external spine on the palpal tibia. Rather than make it a new species it is referred to varietal status.

#### CAMEROTROMBIDIUM DISTINCTUM (Canest., 1897).

*Ottonia distincta* Canest., 1897. Termes. Fuzet. p. 461; *idem* 1898 Atti. Soc. Veneto-Trentina, 391, pl. 22, fig. 5, 7.

*nec Microtrombidium (Enemothrombium) distinctum* Berl. Redia, 8 (1), 193. Fig. 92.

*Enemothrombium distinctum* Ouds. 1927 Ent. Ber. 7, (156), 229.

*Enemothrombium distincta* Ouds. 1928. Treubia. 7, suppl. 2. 70, fig. 90-99.

*Camerotrombidium distinctum* Sig Thor, 1936, Zool. Anz., 114, 32.

#### Fig. 26 A-I.

Redescription. Shape as in *C. simile* with the usual posteriorly concave suture between propodosoma and hysterosoma. Colour in life red. Length to 1.1 mm., width to 0.6 mm. Crista linear, 234μ long with a subposterior, broad sensillary area at about  $\frac{2}{3}$  from apex, the sensillary area is longitudinally septate, sensillae long and filamentous, bases 40μ apart. Eyes 2+2, on well defined sessile ocular shields. Palpi as figured, tibia with strong apical and accessory claws, two pectines and externally a strong, stout, rather short spine; tarsus elongate, not reach-



ing tip of apical claw. Legs I  $870\mu$ , II  $540\mu$ , III  $540\mu$ , IV missing; tarsus I elongate  $216\mu$  long by  $90\mu$  high, metatarsus I  $115\mu$  long.

Dorsal setae papilliform, of two sizes, larger  $14\mu$  long, somewhat cup-like with strong setules, smaller fusiform with ciliations (fig. 26 D, E), on the legs normally with rod-like ciliated setae but on leg IV, on the trochanter (the rest of leg IV is missing on both sides) there are some setae in the form of a clasped hands with 5-7 digits.

*Loc.* One specimen from soil (Berlese funnel), Dobodura, New Guinea, 1944 (G. M. Kohls.) A second specimen from leaf mould, at edge of rain forest, Dobodura, Oct., 1944 (D.C.S.).

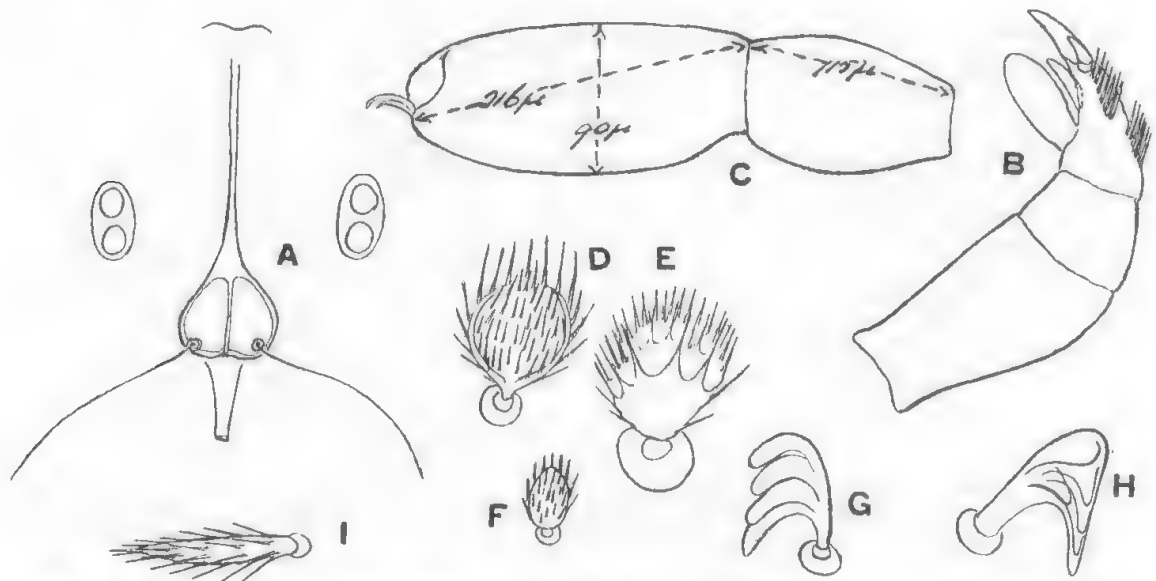


Fig. 26. *Camerotrombidium distinctum* (Canest). A, Crista and eyes ( $\times 200$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 200$ ); D and E, dorsal and ventral views of larger dorsal seta ( $\times 860$ ); F, smaller dorsal seta ( $\times 860$ ); G and H, two views of the specialized setae on basal segments of leg IV ( $\times 860$ ); I, ordinary leg seta ( $\times 860$ ).

Remarks. In 1912 Berlese (*loc. cit.*) synonymized with Canestrini's *Ottonia distincta* from New Guinea, the species (of which he had been given a specimen) described by Trägårdh, 1904 (Entom. Tidsk., 25, 151, pl. 2, fig. 1-10, 16) from the Cameroons, West Africa, as *Trombidium bipectinatum*. As in all his species, Canestrini's description is brief and inadequate, but Berlese's conclusions appear to have been based on the peculiar hand-like setae on the fourth leg found in the two species.

Canestrini, however, speaks of the dorsal setae as "grani piccoli e grossi spinosi"; in Trägårdh's and Berlese's descriptions and figures, the dorsal setae are shown as being clavate and up to  $60\mu$  long, and fusiform to  $10\mu$  long. In the new specimen these setae are more of the form of granules (under low power) the larger to  $14\mu$  in length and the smaller  $8\mu$ . They are thus in agreement with Canestrini's description.

The new specimen is rather smaller than Canestrini's,  $1.1\text{ mm.} \times 0.6\text{ mm.}$  as compared with  $3.0\text{ mm.} \times 1.5\text{ mm.}$ , but it is an adult and therefore possibly a male.

As compared with *bipectinatum* the apical portion of the palpal tibia is much shorter and the front tarsi and metatarsi although of approximately the same relative dimensions are much smaller.

The new specimen then seems undoubtedly to be Canestrini's species, which is not the same as Trägårdh's *bipectinatum* from Africa.

In describing a specimen from Buru, Oudemans in Trenbia (*loc. cit.*) also shows that Trägårdh's *bipectinatum* from the Cameroons is not the same as *distinctum* of Canestrini from New Guinea, as stated by Berlese (1912). Oudemans' specimen was an old and well developed female and measured 3.777 mm. in length. His details and figures agree well with those given in the above description.

The species described by Boshell and Kerr, 1942, from Columbia under the name of *Microtrombidium arborealis*, but which is here considered a *Camicrotrombidium*, has also the peculiar palmate setae on the fourth legs and is therefore closely related to Trägårdh's *bipectinatum* and to *distinctum* of Canestrini.

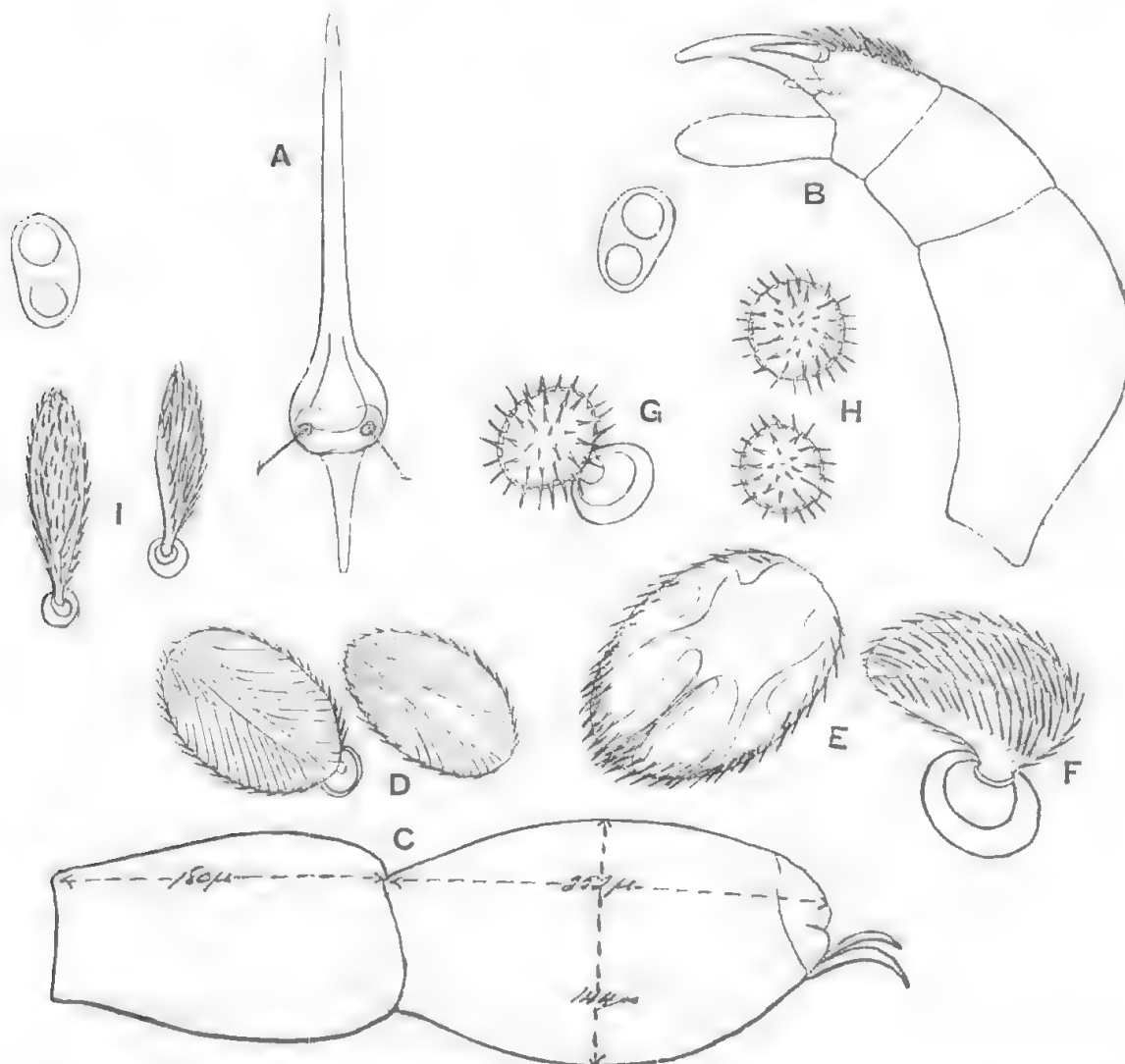


Fig. 27. *Holcotrombidium securigerum* (Canest). A, Crista and eyes ( $\times 200$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 200$ ); D, E, F, larger dorsal setae from above, below and side respectively ( $\times 860$ ); G and H, smaller dorsal setae ( $\times 860$ ); I, leg seta ( $\times 860$ ).

#### Genus *HOLCOTROMBIDIUM* nov.

Microtrombidiinae in which the dorsal setae are uniform or if of two sizes or forms then the larger ones, decumbent and somewhat scale-like, with their lateral edges curved under to form a channel or helmet-like structure.

Genotype *Ottomia securigera* Canest.

*HOLCOTROMBIDIUM SECURIGERUM* (Canest.)

*Ottonia securigera* Canest., 1897. Termes. Fuzet, 463; *idem* 1898 Atti Soc. Veneto-Trentino, 391, pl. 22, fig. 2.

*Microtrombidium* (*Enemothrombium*) *securigerum* Berl., 1912, Redia, 8 (1), 201.

Fig. 27 A-I.

Redescription. Colour in life red. Shape oval with moderately prominent rounded shoulders. Length to 1.5 mm., width to 0.975 mm. Crista linear, 252 $\mu$ , with subposterior sensillary area at about  $\frac{2}{3}$  from apex, sensillae ca. 180 $\mu$  long, filamentous and apparently nude, sensillae bases 40 $\mu$  apart. Eyes 2+2, sessile, on well developed ocular shields, in advance of sensillary area, posterior the smaller. Palpi as figured, moderately stout, tibia with stout apical and smaller accessory claw, tarsus elongate, reaching tip of claw; legs all shorter than body, I 1350 $\mu$ , II 750 $\mu$ , III 750 $\mu$ , IV 975 $\mu$ ; tarsus I elongate, 252 $\mu$  long by 144 $\mu$  high, ratio length to height = 1.75, metatarsus I 180 $\mu$  long, ratio of length tarsus to metatarsus = 1.4. Dorsal setae of two kinds, the larger appearing dorsally as large ovoid, ciliated, decumbent scales, to 30 $\mu$  long, on edge of body in lateral view appearing somewhat hatchet-shaped, actually, as can be seen from a ventral view, they are really scales in which the sides are turned down to form a cavity like a helmet (cf. fig. 27 D.E.F.); smaller setae 14 $\mu$  in diam., globose with strong denticles (cf. fig. 27 G.H.). The legs are thickly clothed with more lanceolate ciliated setae, 30 $\mu$  long, but still showing the recurved lateral margins (cf. fig. 27 I).

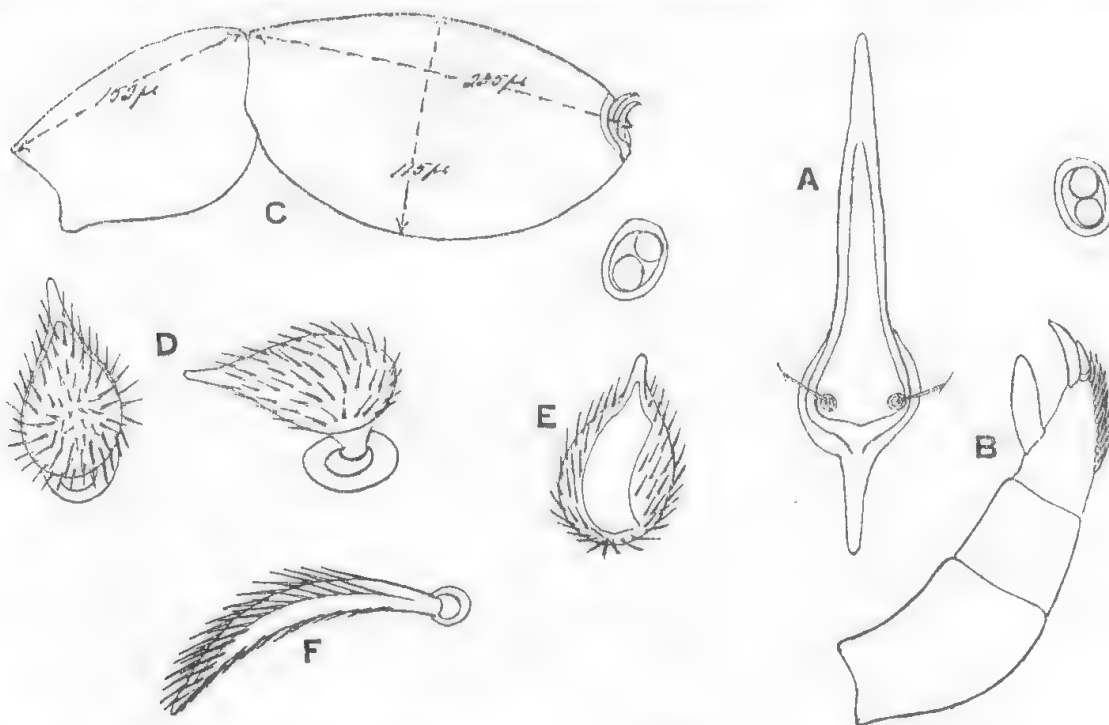


Fig. 28. *Holcotrombidium cygnus* (Wom.). A, Crista and eyes ( $\times 200$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 200$ ); D and E, dorsal, lateral and ventral views of dorsal setae ( $\times 860$ ); F, leg seta ( $\times 860$ ).

two pectines and a short stout external spine arising near base of apical claw, tarsus elongate, reaching tip of claw; legs all shorter than body, I 1350 $\mu$ , II 750 $\mu$ , III 750 $\mu$ , IV 975 $\mu$ ; tarsus I elongate, 252 $\mu$  long by 144 $\mu$  high, ratio length to height = 1.75, metatarsus I 180 $\mu$  long, ratio of length tarsus to metatarsus = 1.4. Dorsal setae of two kinds, the larger appearing dorsally as large ovoid, ciliated, decumbent scales, to 30 $\mu$  long, on edge of body in lateral view appearing somewhat hatchet-shaped, actually, as can be seen from a ventral view, they are really scales in which the sides are turned down to form a cavity like a helmet (cf. fig. 27 D.E.F.); smaller setae 14 $\mu$  in diam., globose with strong denticles (cf. fig. 27 G.H.). The legs are thickly clothed with more lanceolate ciliated setae, 30 $\mu$  long, but still showing the recurved lateral margins (cf. fig. 27 I).

*Loc.* Two specimens from soil, Dobodura area, New Guinea, 3rd May, 1944 (G. M. Kohls).

*Remarks.* In spite of Canestrini's brief description of this species from Finschhafen, there seems little doubt but that the above two specimens are the same. Of

the dorsal setae Canestrini says "di grani et di squammette discoidali vestite di spine", which appears to agree entirely with the above. The only characters in which there is a slight difference are the front tarsi and metatarsi, of which Canestrini gives the first as twice as long as the second. In the new specimens the ratio is 4:3. He also states that the crista is posteriorly bifid, which is doubtful.

*HOLCOTROMBIDIUM CYNUS* (Womersley, 1936).

*Microtrombidium* (*Euemathrombium*) *cynus* Wom., 1936, Journ. Linn. Soc. London, Zoology, 40 (269), 109, fig. 3 a-c.

Fig. 28 A-F.

A second specimen of this interesting species was collected at Bardon, Queensland, in August, 1943 (N.B.T.).

Comparison with the type from Kangaroo Is., South Australia, shows that they are the same but that the drawings previously given, especially of the dorsal setae are not all that could be desired. Fresh figures derived from the Queensland specimen are therefore given in this paper. The dorsal setae are the shape of a swan's head with a distinct beak and long ciliations (not as previously figured). On careful examination, however, the setae are seen to consist of a thin scale, of which the edges are strongly curved under to form a helmet-like structure with a relatively small opening ventrally. The leg setae are more elongate and foliate but still showing the ventral folding.

*HOLCOTROMBIDIUM SCALARIS* (Wom., 1936).

*Euthrombium scalaris* Womersley, 1936, Jour. Linn. Soc., London, Zool., 40 (269), 112, fig. 5 a-c.

Fig. 29 A-F.

This species was described from Auckland, New Zealand, as a doubtful *Euthrombium* for it lacks the posterior dorsal plate. It is now placed in the new genus *Holcotrombidium*.

As there were some slight errors in the original description and the dorsal setae were not sufficiently described the following notes and fresh figures are now given.

The palpal tibia externally carries a slender spine arising from near the base of the palpal tarsus. The front tarsi of the unique type now measure  $435\mu$  long by  $180\mu$  high, giving a ratio of 2.4, and the metatarsus is  $360\mu$  long, giving a ratio of tarsus to metatarsus of 1.2. The dorsal setae are up to  $50\mu$  long (not  $120\mu$  as previously given) and lie like closely adpressed scales; they are about  $\frac{1}{4}$  as wide as long, laminate, with strongly incurved margins but not giving quite such a helmet-like appearance as in the two preceding species; they are dark brown in colour and ciliated on the lateral margins (cf. fig. 29 D). Ventrally the setae are shorter, to  $25\mu$ , more hyaline and pointed but still showing the folding; on the legs they are similar, but reaching  $40\mu$  in length (cf. fig. 29 E).

*HOLCOTROMBIDIUM DENTIPILE* (Canest., 1897).

*Ottonia dentipilis* Canestrini, 1897. Termes. Fuzet., 464.

*Microtrombidium* (*Euemathrombium*) *dentipile* Berl. 1912, Redia, 8 (1), 198.

Fig. 30 A-F.

This species was originally described by Canestrini from Kinschhafen, New Guinea and later recorded by Berlese with more details and figures of the palp, front tarsus and metatarsus, dorsal setae and specialized setae from legs from Tijompea and Buitenzorg in Java.

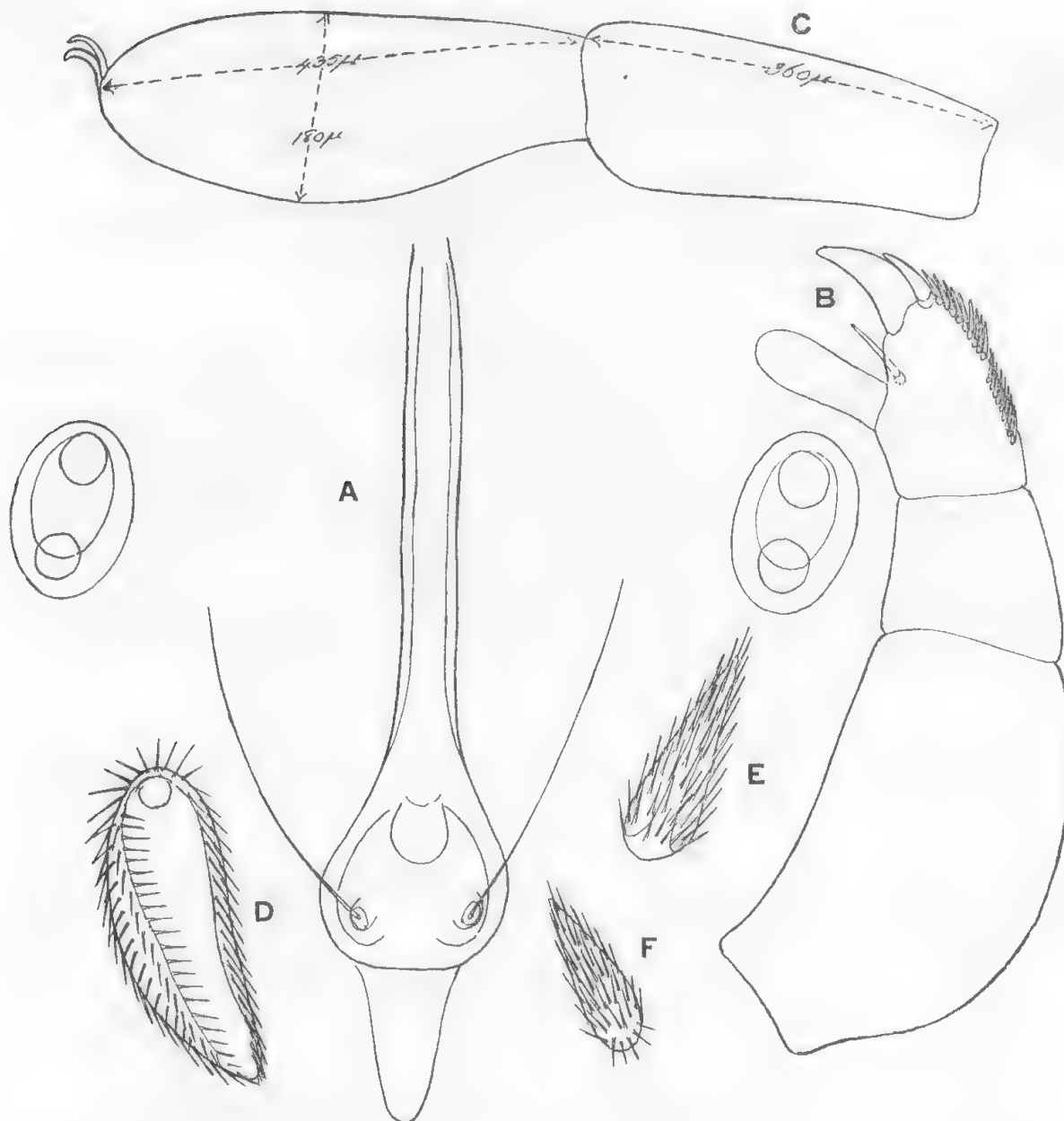


Fig. 29. *Holcotrombidium scalaris* (Wom.). A, Crista and eyes ( $\times 200$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 125$ ); D, dorsal seta from below ( $\times 860$ ); E, leg seta ( $\times 860$ ); F, ventral seta ( $\times 860$ ).

I have recently, through the kindness of Sq./Ldr. G. R. Radford, had the privilege of studying two specimens of what must be referred to this species or to a variation of it, from Colombo, Ceylon. The specimens were collected by Sq./Ldr. Radford on 30th Aug., 1944.

The two specimens are both somewhat smaller than the dimensions given by Canestrini and Berlese, namely,  $975\mu$  long by  $675\mu$ , as compared with  $1800\mu$  and  $1250\mu$  respectively. The front tarsus is  $210\mu$  long by  $110\mu$  high, giving a ratio of  $1.0:1.91$ , whereas Berlese's figures give a ratio of  $1.0:2.0$ , the metatarsus,  $146\mu$  long, is rather shorter in proportion to the tarsal length, giving  $1.0:1.17$ . The dorsal setae are of the two forms as figured by Berlese, although the large decumbent scale-like ciliated setae measure only ca.  $35\mu$ , as compared with  $60\mu$  given by Berlese. Strictly these setae are not scale-like, but have the lateral margins in-

curved ventrally to give the more or less helmet-like form of the genus *Holcotrombidium*. The smaller setae are as featured by Berlese, with a number of branching granular lobes. Berlese (fig. 82 D-E) shows the specialized comb-like or serrate setae found on segments III onwards of the legs. These are the same on the specimens from Ceylon and measure  $35\mu$  long (Berlese does not give the length).

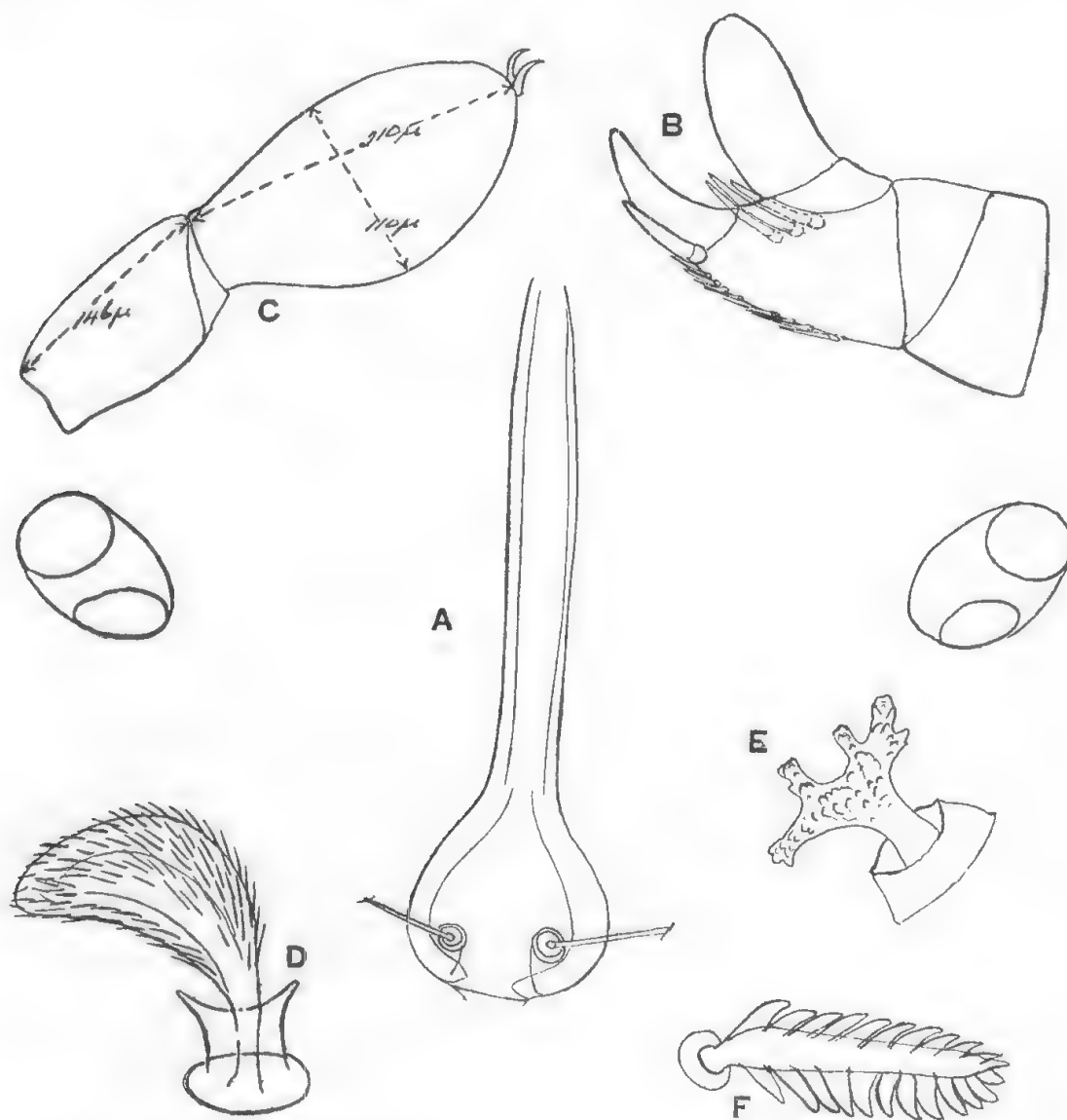


Fig. 30. *Holcotrombidium* cf. *dentipile* (Canest). Specimen from Ceylon. A, Crista and eyes ( $\times 375$ ); B, palp ( $\times 375$ ); C, front tarsus and metatarsus ( $\times 200$ ); D, larger dorsal seta ( $\times 860$ ); E, smaller dorsal seta ( $\times 860$ ); F, leg seta ( $\times 860$ ).

The crista is linear,  $200\mu$  long, with a posterior sensillary area, and with SB  $30\mu$  apart; the sensillae are filamentous. The palpi are stout, as figured by Berlese, with strong apical tibial claw, strong accessory claw and two indistinct pectines on tibia, and on the external side of tibia with 3 strong long spine-like setae. Berlese states and figures only one such seta but the number of these external spines in some species (e.g. of the genus *Camerotrombidium*) appears to be variable, and consequently while referring the Ceylon material to *dentipile* it should perhaps be considered as a variety. The palpal tarsus is stout, elongate and overreaches tip of tibial claw. The eyes are 2 on each side, prominent and sessile.

## Genus LAMINOTROMBIDIUM Wom., 1937.

Rec. S. Aust. Mus., 6 (1), 90. Genotype: *Microtrombidium myrmicum* Wom., 1934.

Dorsal body setae uniform, hyaline, leaf-like and pointed, with strong mid-rib and long marginal ciliations. Palpal tibia with strong apical claw and pectine of few strong teeth. Front tarsus elliptical with height more than half its length.

## LAMINOTROMBIDIUM MYRMICUM (Wom., 1934).

*Microtrombidium myrmicum* Wom., 1934. Rec. S. Aust. Mus., 5 (2), 189. Fig. 21-23.

*Laminotrombidium myrmicum* Wom., 1937. Rec. S. Aust. Mus., 6 (1), 90.

Although not stated in the original description the palpal tibia of this species has a long, rather slender external spine, arising from near the base of tarsus.

## Genus FOLIOTROMBIDIUM nov.

Microtrombidiinae in which some or all of the dorsal setae are thin and laminate, elongate, blunt at apex and the margins not recurved.

Genotype: *Enemotrombidium evansi* Wom., 1937.

## FOLIOTROMBIDIUM EVANSI (Wom., 1937).

*Enemotrombidium evansi* Womersley, 1937. Rec. S. Aust. Mus., 6 (1), 91, fig. 1 h-j.

## Fig. 31 A-D.

Rather small species 1.1 mm. long by 0.7 mm. wide. Colour in life reddish. Crista  $245\mu$ , linear, with subposterior sensillary area at about  $\frac{2}{3}$  from apex, sensillae long and filamentous, with bases  $25\mu$  apart. Eyes 2+2, on distinct ocular shields. Palpi with strong apical tibial claw, strong accessory claw, two pectines, but without external spine on tibia. Legs shorter than body, tarsus I broadly elliptical,  $209\mu$  long by  $137\mu$  high, metatarsus I  $120\mu$  long. Dorsal setae uniform, elongate, laminate, broadly rounded apically and with longitudinal rows of short strong spinules, 24-32 $\mu$  long (cf. fig. 31 D).

*Loc.* Only known from the type from Mt. Wellington, Tas., May, 1935 (J.W.E.).

*Remarks.* The other two specimens from Queensland and Victoria referred to this species in my original publication (*loc. cit.*) are not co-specific and are here-with described as a new species.

The dimensions of the crista and front tarsi and metatarsi in the original description are somewhat inaccurate.

## FOLIOTROMBIDIUM BISETOSUM sp. nov.

## Fig. 31 E-H.

*Description.* Adult. Length to 1.35 mm., width to 0.85 mm. Shape elongate oval, broadest across shoulders. Colour in life red. As mounted division line between propodosoma and hysterosoma indistinct. Crista  $218\mu$  long, linear, with subposterior sensillary area at about  $\frac{2}{3}$  from apex. Sensillae long and  $25\mu$  apart. Eyes small, 2+2, on distinct ocular shields. Palpi stout, tibia with strong apical claw, smaller accessory claw and two pectines, but no external spine: tarsus elongate but not reaching tip of tibial claw. Legs all shorter than body, I  $750\mu$ ,



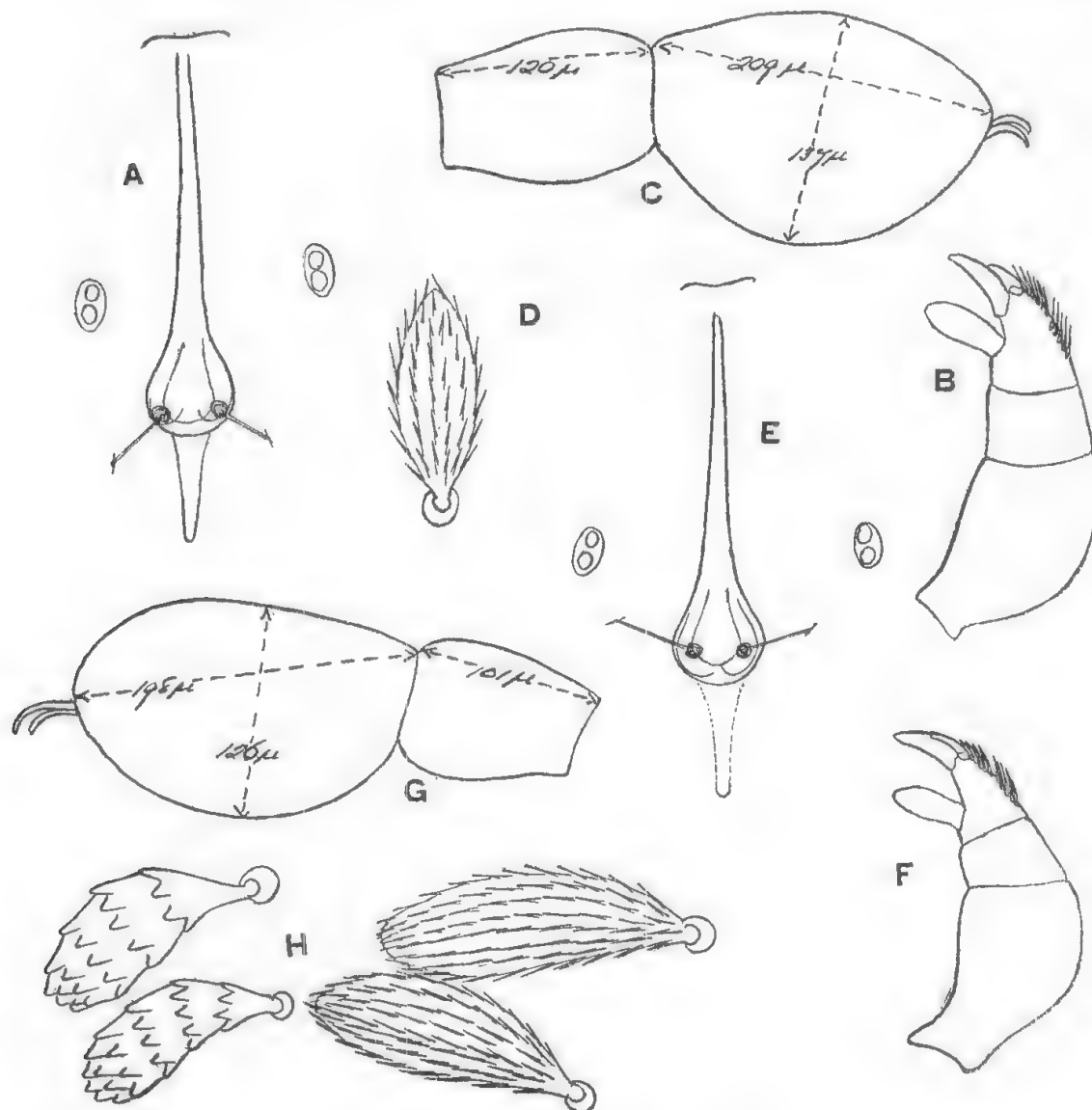


Fig. 31. A-D. *Foliotrombidium evansi* (Wom.). A, Crista and eyes ( $\times 200$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 200$ ); D, dorsal seta ( $\times 860$ ). E-H. *Foliotrombidium bisetosum* sp. n. E, Crista and eyes ( $\times 200$ ); F, palp ( $\times 200$ ); G, front tarsus and metatarsus ( $\times 200$ ); H, dorsal setae ( $\times 860$ ).

II  $510\mu$ , III  $510\mu$ , IV  $870\mu$ , tarsus I  $198\mu$  long by  $120\mu$  high, metatarsus I  $101\mu$  long. Dorsal setae of two kinds, the longer elongate and lamellate, with rounded apex and longitudinal rows of strong short spinules or ciliations, to  $40\mu$  long; shorter slightly curved, not so lamellate, and with strong rounded nodules (cf. fig. 31 H).

*Loc.* Type and paratype from moss, Brisbane, Queensland, Oct., 1934. Another specimen from Fern Tree Gully, Victoria, Jan., 1937 (H.W.).

*FOLIOTROMBIDIUM ORNATUM* sp. nov.

Fig. 32 A-D.

**Description.** Adult. Length  $1.2\text{ mm.}$ , width  $0.6\text{ mm.}$  Shape an elongate oval, broadest across the shoulders which are well rounded but not prominent. Colour in life red. Crista linear,  $272\mu$  long, with subposterior sensillary area at about  $\frac{2}{3}$  from apex, sensillae long and filamentous, apparently nude, with bases

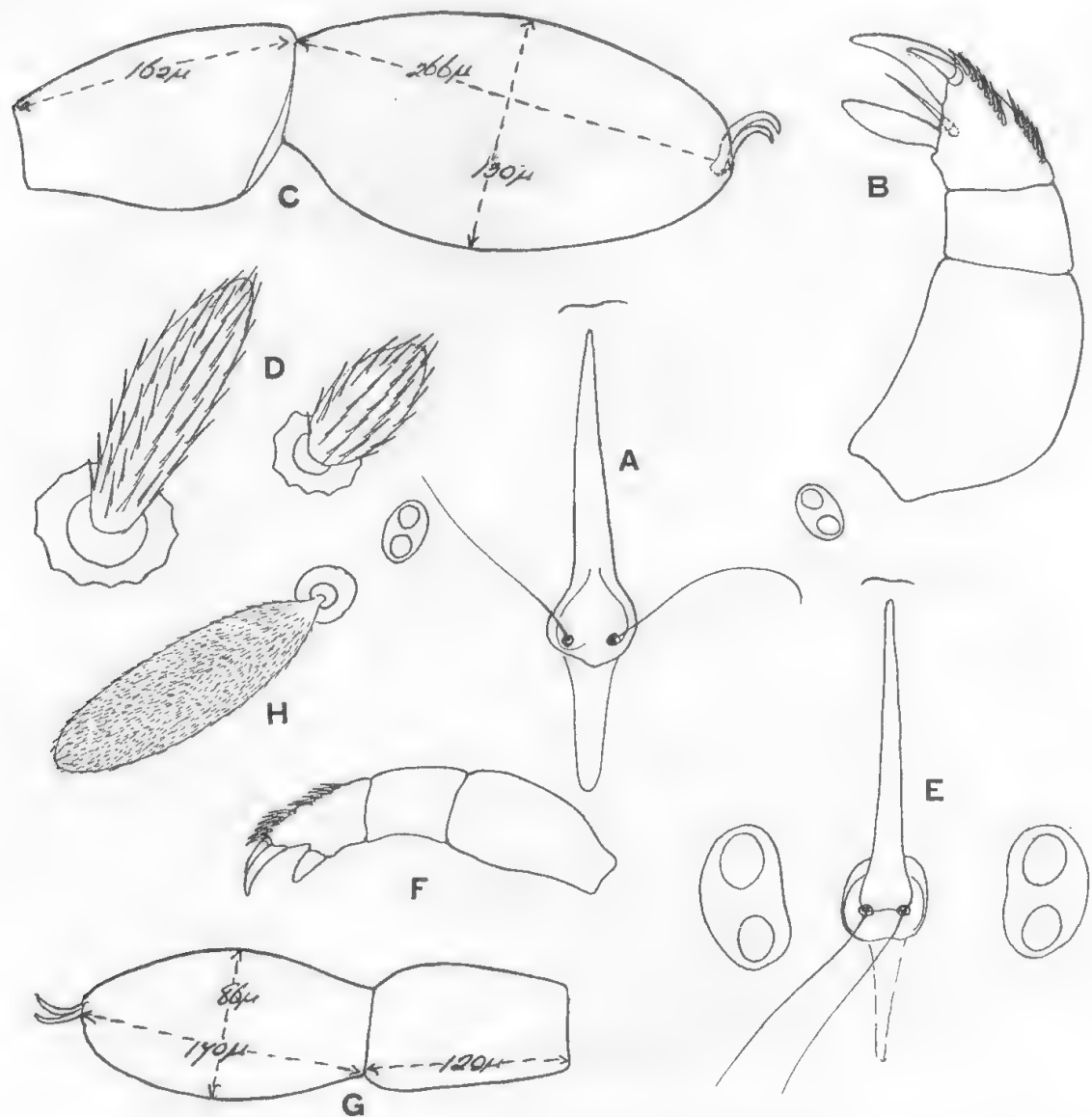


Fig. 32. A-D. *Foliotrombidium ornatum* sp. n. A, Crista and eyes ( $\times 200$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 200$ ); D, dorsal setae ( $\times 860$ ). E-H. *Foliotrombidium kohlsi* sp. n. E, Crista and eyes ( $\times 200$ ); F, palp ( $\times 200$ ); G, front tarsus and metatarsus ( $\times 200$ ); H, dorsal setae ( $\times 860$ ).

30μ apart. Eyes 2+2, on well defined ocular shields. Palpi stout, tibia with strong apical claw, smaller accessory claw, two pectines and a long slender external spine from near base of tarsus; tarsus elongate, but not reaching tip of claw. Legs not longer than body, I thicker than others, 1050μ long, II 675μ, III 675μ, IV 1020μ; tarsus I elongate oval, 266μ long by 130μ high, metatarsus I 162μ long. Dorsal setae uniformly of the same form but varying in length from 20μ to 40μ, laminate, with rounded apex, with longitudinal rows of spinules, width ca. 10μ, arising from short peduncles.

*Loc.* A single adult specimen from Belair, S. Australia, 29th May, 1938 (H.W.).

*Remarks.* Can be distinguished as in the following key.

*FOLIOTROMBIDIUM KOHLST* sp. nov.

Fig. 32 E-H.

Description. Adult. Length 1.5 mm., width 0.9 mm. Shape elongate oval, broadest across the moderately prominent shoulders. Suture between propodosoma and hysterosoma distinct. Colour red. Crista linear,  $182\mu$  long with subposterior sensillary area at about  $\frac{2}{3}$  from apex, posterior arm almost obsolete, sensillae long and filamentous, apparently nude, and with their bases  $25\mu$  apart. Eyes large, 2+2, on well defined ocular shields, and in line with sensillary area, sessile. Palpi as in fig. 32 F, tibia with strong apical claw and accessory claw, two pectines, but no external spine; tarsus short and stumpy, only just passing base of large tibial claw. Legs all shorter than body, I  $825\mu$ , II  $510\mu$ , III  $570\mu$ , IV  $690\mu$ ; tarsus I elongate,  $170\mu$  long by  $80\mu$  high, metatarsus  $120\mu$  long. Dorsal setae uniform consisting of very thin laminae,  $40\mu$  by  $10\mu$  wide, with rounded apex and furnished with very short fine pubescence; similar setae extend on to legs as far as the tarsi; and on to the femur of the palpi.

Loc. A single specimen from soil, Goodenough Is., New Guinea, 17th Jan., 1944 (G. M. Kohls). A second specimen from the same locality, 31st Dec., 1943 (D.C.S.).

Remarks. Distinguished as in the key.

KEY TO THE ABOVE SPECIES OF *Foliotrombidium*.

- |  |    |    |    |                        |
|--|----|----|----|------------------------|
| 1. Front tarsus ca. $1\frac{1}{2}$ times as long as high ..  | .. | .. | .. | 2.                     |
| Front tarsus ca. twice as long as high ..  | .. | .. | .. | 3.                     |
| 2. Dorsal setae uniform, of one type (cf. fig. 31 D) ..  | .. | .. | .. | <i>evansi</i> Wom.     |
| Dorsal setae of two types (cf. fig. 31 H) ..   | .. | .. | .. | <i>bisetosum</i> n.sp. |
| 3. Dorsal setae uniform, very thinly laminate with fine pubescence. Palpal tibia without external spine. Eyes large and in line with sensillary area ..  | .. | .. | .. | <i>kohlsi</i> n.sp.    |
| Dorsal setae of varying size, but the one type, not thinly laminate, furnished with strong setules. Palpal tibia with a long slender external spine. Eyes smaller and in advance of sensillary area .. | .. | .. | .. | <i>ornatum</i> n.sp.   |

Genus *HIOTROMBIDIUM* nov.

Microtrombidiinae in which the dorsal setae are mainly or entirely bifurcate from the base, and consist of two opposed curved ciliated lamellae, forming a pair of lips; the lamellae may be entire or secondarily divided.

Genotype: *Calothrombium tubbi* Wom., 1937.

*HIOTROMBIDIUM TUBBI* (Wom., 1937).

*Calothrombium tubbi* Womersley, 1937, Rec. S. Aust. Mus., 6 (1), 86. Fig. 1 a-d; *ibid.*, 1942, Rec. S. Aust. Mus., 7 (2), fig. 5 E-H.

Fig. 33 A-F.

The palpal tibia has a strong slender external spine (not shown in the original figure) arising from between base of claw and base of tarsus. The dorsal setae are uniform on the hysterosoma,  $24\mu$  long, with the upper lamella strongly curved and broad (cf. fig. 33 D and E) and the lower lamella straight, more or less tapering and not so broad, but with long spinules. Along the crista, the setae are of similar form, to  $45\mu$  long, with the upper lamella not so curved and apparently not so broad (cf. fig. 33 F). Anterolaterally on the propodosoma, the setae are

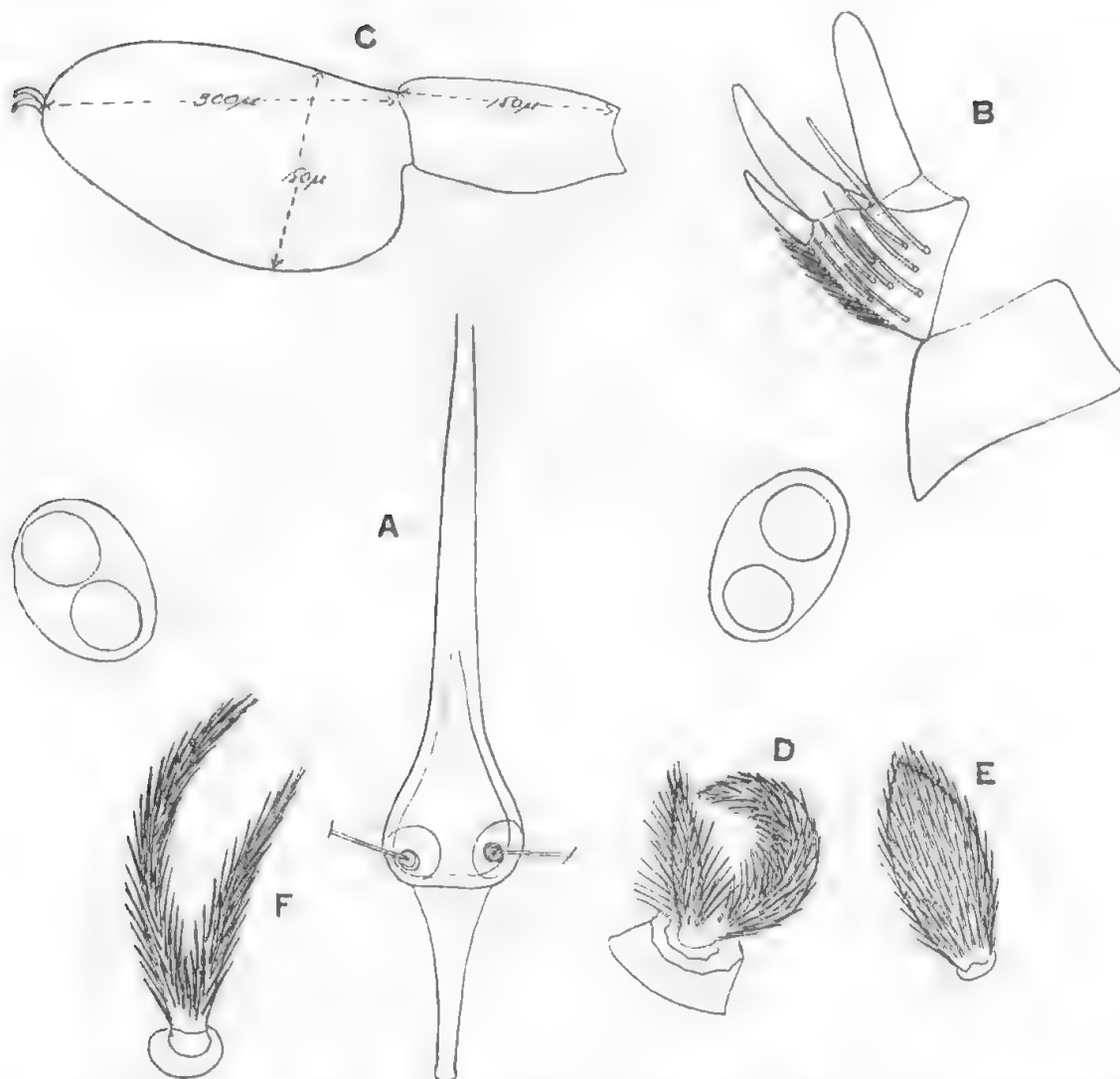


Fig. 33. *Hiotrombidium tubbi* (Wom.). A, Crista and eyes ( $\times 200$ ); B, palpal tibia ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 125$ ); D, dorsal setae from side ( $\times 860$ ); E, same from above ( $\times 860$ ); F, dorsal seta from propodosoma ( $\times 860$ ).

simple, elongate, pointed and ciliated, with a few of them forked distally. The leg setae are simple, ciliated and more or less curved. The sensillae long and filamentous, with bases  $40\mu$  apart.

*Loc.* Only known from the original specimen from Heathmont, Vic., 28th July, 1934 (H. Tubb).

#### *HIOTROMBIDIUM HEASLIPI* (Wom., 1942).

*Calothrombium heaslipi* Womersley, 1942, Rec. S. Aust. Mus., 7 (2), 174. Fig. 5 A-D.

#### Fig. 34 A-D.

This species in the form and size of the dorsal hysterosomal setae is very close to the preceding; these setae are, however, somewhat smaller and the forked structure not so easy to see. Along the crista, along the suture between propodosoma and hysterosoma and anterolaterally on the propodosoma, some of the setae are apparently simple, broadly elongate and ciliated, with rounded apex; otherwise the setae are as on the rest of the dorsum. The palpal tibia has a long slender external spine (not shown in earlier figure). Crista linear,  $290\mu$  long,

with subposterior sensillary area; sensillae long and filamentous, with bases  $36\mu$  apart.

*Loc.* Still only known from the original specimens from Cairns, Queensland, 1939 (W.G.II.).

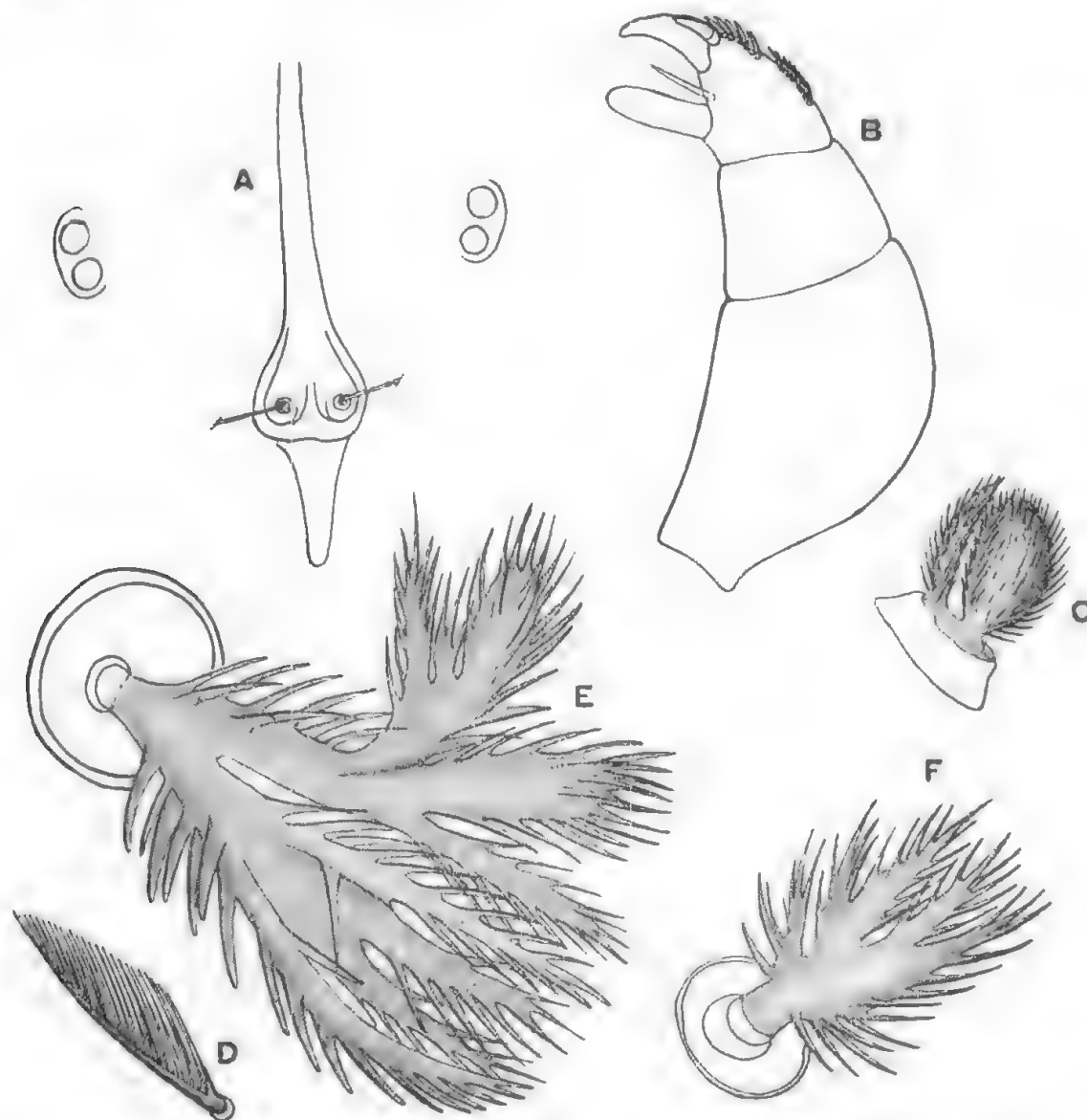


Fig. 34. A-D. *Hiotrombidium heaslipi* (Wom.). A, Crista and eyes ( $\times 200$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 200$ ); D, dorsal seta ( $\times 860$ ). E-F. *Hiotrombidium koordanum* (Hirst). E, Larger dorsal seta ( $\times 860$ ); F, smaller dorsal seta ( $\times 860$ ).

#### *HIOTROMBIDIUM KOORDANUM* (Hirst, 1938).

*Microtrombidium koordanum* Hirst, 1928. P.Z.S. 1023 fig. 2 B.E.

*M. (Enemothrombium) koordanum* Womersley 1934. Rec. S. Aust. Mus., 5 (2), 195.

*Calothrombium koordanum* Womersley, 1937 *ibid.*, 6 (1), 85.

#### Fig. 34 E-F.

The dorsal setae of this species are approximately of two sizes, in which the larger, to  $80\mu$  long, consist essentially of two lamellae which are themselves second-

arily forked, but they form opposing convex lobes as in the preceding species; they are furnished with long and strong spinules. The smaller setae to  $40\mu$  long, appear to be simple although forked (cf. fig. 34 F).

*HIOTROMBIDIUM CANBERRAENSE* sp. nov.

Fig. 35 A-I.

Description. Adult. Colour in life red. Shape somewhat elongate oval, broadest across the shoulders. Length  $1.725$  mm, width  $1.05$  mm. Legs shorter than body. Crista linear,  $345\mu$ , with subposterior sensillary area, SB  $36\mu$  apart. Sen-

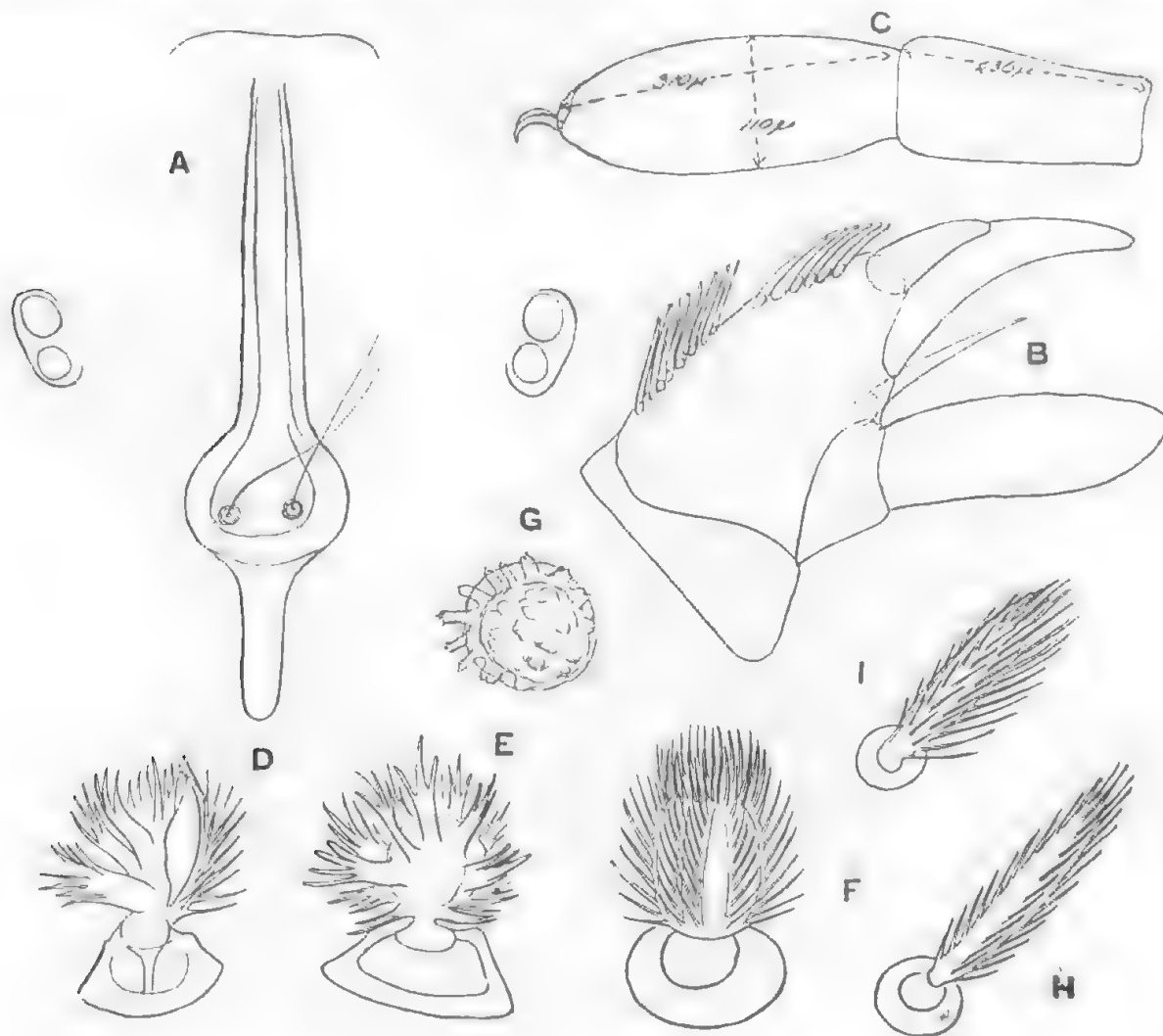


Fig. 35. *Hiotrombidium canberraense* sp. n. A, Crista and eyes ( $\times 200$ ); B, palpal tibia ( $\times 375$ ); C, front tarsus and metatarsus ( $\times 125$ ); D, E, F, G, different views of dorsal setae ( $\times 860$ ); H, dorsal seta from near suture ( $\times 860$ ); I, leg seta ( $\times 860$ ).

sillae filamentous, ca.  $150\mu$  long. Eyes  $2+2$ , on distinct subsessile ocular shields. Palpi stout, tibia with stout apical claw, and smaller stout accessory claw, two pectines and a single long, pointed, external spine arising from near base of tarsus; tarsus elongate, reaching tip of tibial claw. Length of legs, I,  $1350\mu$ , II  $960\mu$ , III  $750\mu$ , IV  $1275\mu$ ; tarsus I  $310\mu$  long by  $110\mu$  high, metatarsus I  $236\mu$  long.

Dorsal setae short,  $27\mu$ , uniform, bifurcate from base as in fig. 35 D-G; although this is only seen with difficulty, the upper branch is subdivided as in

Fig. 35 D-G, the lower with longitudinal rows of long setae; near the suture and base of crista are some long,  $36\mu$ , elongate, simple, ciliated setae as in Fig. 35 H; the legs are thickly covered with setae as in Fig. 35 I, to  $30\mu$  long.

*Lac.* A single specimen found under a stone on Black Mt., Canberra, A.C.T., 19th Oct., 1944 (H.W.).

The above four species may be separated by the following key.

1. One or both lamellae of dorsal setae secondarily branched .. .. . 2.  
Both lamellae of dorsal setae not branched .. .. . 3.
2. Large species to ca. 5.0 mm. Both lamellae of dorsal setae strongly branched. Front tarsus and metatarsus equal,  $660\mu$  long; tarsal highest on apical fourth,  $330\mu$  .. .. . *koordanum* (Hirst, 1928).  
Smaller species, under 2.0 mm. Upper lamella of dorsal setae only, subdivided. Front tarsus distinctly longer than metatarsus,  $310\mu$  long by  $110\mu$  high .. .. . *canberraensis* n.sp.
3. Setae along crista similar to on dorsum but longer; some setae on antero-lateral area of propodosoma simple, elongate and tapering, sometimes distally forked, to  $30\mu$  long .. .. . *tubbi* (Wom. 1937).  
Setae along suture between propodosoma and hysterosoma, antero-laterally on propodosoma and more or less along crista, broadly elongate and blunt at apex, to  $45\mu$  long .. .. . *heastipi* (Wom. 1942).

The three previously described species were earlier placed in the genus *Calothrombium*, largely on the forked dorsal seta as figured by Berlese for *Calothrombium paoli* Berl., the type of this genus. *Calothrombium*, however, in the structure of the crista, and the absence of a distinct sensillary areola-like area, and the position of the sensillae bases, is much more closely related to *Tanaupodus* Haller and should be placed in the subfamily Tanaupodinae Sig Thor, 1935. The above species are definitely belonging to the Microtrombidiinae.

#### Genus PEDOTROMBIDIUM nov.

Form elongate oval as in *Eutrombidium* but without nasus or posterior dorsal plate. Crista linear with subposterior sensillary area. Legs I to III much shorter than body; IV about as long as body, stronger than the others, with its coxae very elongate and attached to coxae III almost at right angles. I and IV with some of middle segments produced laterally at tip on each side. Eyes 2+2 sessile, not on ocular shields. Dorsal setae uniform dorsally and ventrally, fusiform, on short tubules. Palpi with tibial claw and accessory claw.

Genotype: *Pedotrombidium kohlsi* n.sp.

#### PEDOTROMBIDIUM KOHLSI sp. nov.

##### Fig. 36 A-F.

Description. Shape an elongate oval, without prominent shoulders, rather tapering posteriorly, hysterosoma widest medially somewhat in front of coxae III; propodosoma triangular, without nasus, narrower basally than hysterosoma. Length to 0.915 mm., width to 0.45 mm. Crista linear,  $165\mu$  long, with subposterior sensillary area at about  $\frac{2}{3}$  from tip, sensillary bases  $21\mu$  apart, sensillae filamentous ca.  $130\mu$  long, and apparently nude. Eyes 2+2, small and placed close to lateral margin of propodosoma, not greatly in front of sensillary area, sessile, not on ocular shields. Legs, except IV much shorter than body, I  $600\mu$ , II  $420\mu$ , III  $450\mu$ , IV  $825\mu$ , IV much stronger than others, its coxae longitudinally elongate and attached almost at right angles to coxae III; tarsus I elongate,  $170\mu$  long by  $72\mu$  high giving a ratio of 2.36; metatarsus I  $108\mu$  long giving ratio of length of tarsus to metatarsus of 1.57. Leg I on segments 5 and 6 and IV on segments 4-6 produced laterally on each side at tip in irregular teeth (cf. fig. 36 G, II). Palpi not very stout, tibia with strong apical and accessory claw, two pectines but no external spines; tarsus elongate, slightly exceeding tip of claw.



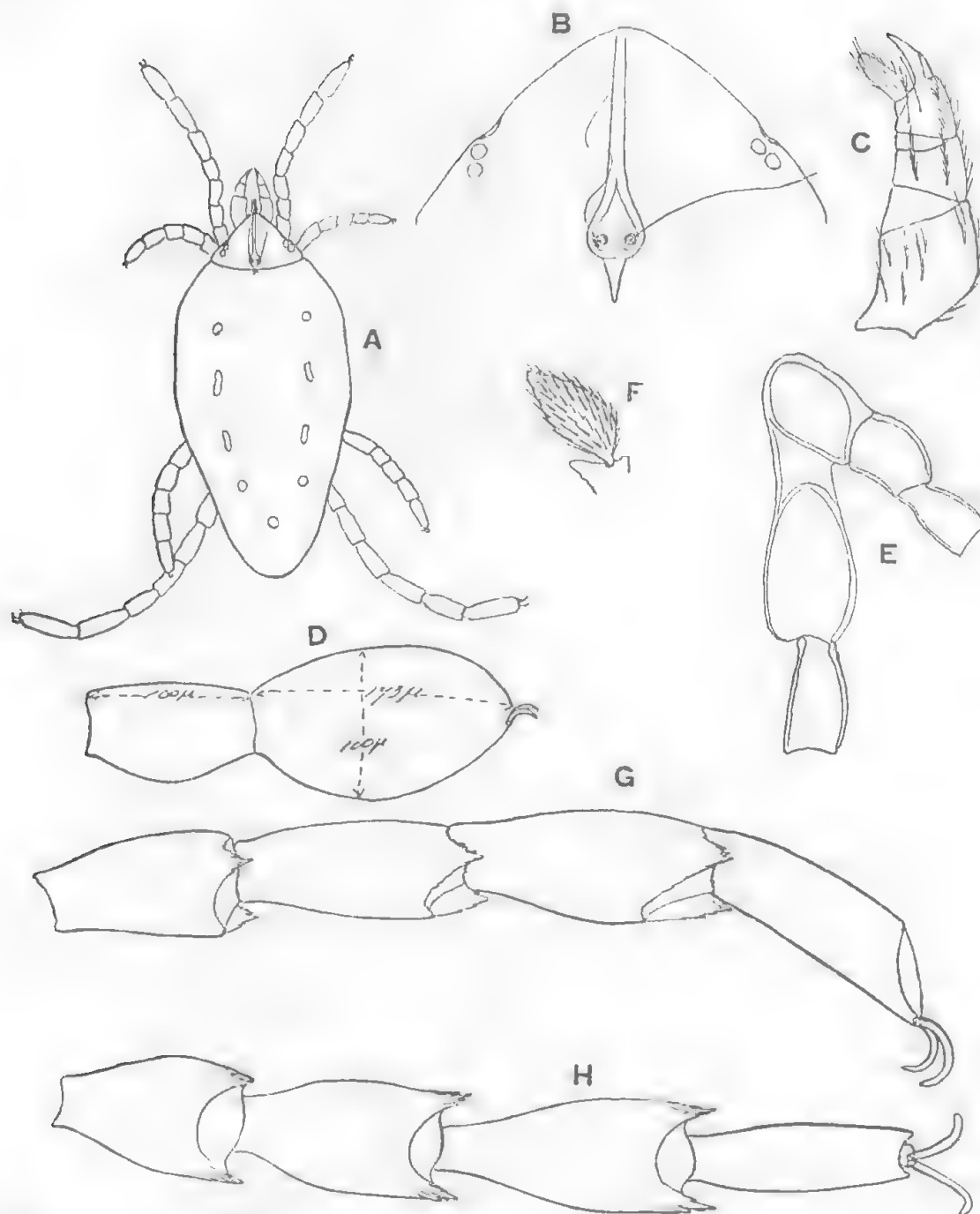


Fig. 36. *Pedotrombidium kohlsi* sp. n. A, Entire dorsal view; B, front of propodosoma showing crista and eyes ( $\times 200$ ); C, palp ( $\times 200$ ); D, front tarsus and metatarsus ( $\times 200$ ); E, coxae III and IV; F, dorsal seta ( $\times 860$ ); G, leg IV, distal segments from side ( $\times 200$ ); H, same from below ( $\times 200$ ).

Clothing both dorsally and ventrally uniform,  $16-18\mu$ , fusiform, conical, pointed, ciliated setae arising from distinct pedicels; near the margins of propodosoma they become a little more elongate. On the hysterosoma a series of 9 chitinized, hexagonally patterned, muscle spots are observable.

*Loc.* Some half-dozen specimens of this very interesting species were collected from soil in New Guinea, 1943, by Maj. Glen M. Kohls, after whom I have much pleasure in naming it.

## Genus PLATYTROMBIDIUM Sig Thor, 1936.

Zool. Anz., 1936, 114, 31.

This genus was erected by Sig Thor for those species, placed by Berlese in the genus *Encmorthrombium*, in which the dorsal setae were fusiform with fine ciliations. He cited *Trombidium vagabundum* Berl., 1903 as the genotype, and included the following additional species: *fuscicornum* (Berl., 1910); *sylvaticum* (C. L. Koch, 1835) (= *simulans* (Berl., 1910)); *trispinum* (Berl., 1910); *quadrispinum* (Berl., 1910); and *platychirum* (Berl., 1910). In 1937 I added Hirst's South Australian species *paranum*.

## PLATYTROMBIDIUM PARANUM (Hirst, 1928).

*Microtrombidium paranum* Hirst, 1928, P.Z.S. 1026, fig. 3 B.E; Womersley, 1934, Rec. S. Aust. Mus., 5 (2), 191.

*Platytrombidium paranum* Womersley, 1937, Rec. S. Aust. Mus., 6 (1), 90.

## Fig. 37 A-D.

Redescription. Colour bright red. Shape as in the species of *Camerotrombidium*, with the usual sulcus between propodosoma and hysterosoma. Length to 1.5 mm. approx., width to 1.0 mm. approx. across shoulders (in type ca. 1.25 mm. and ?). Crista to  $342\mu$  long (missing in type), linear, with subposterior sensillary area at about  $\frac{2}{3}$  from anterior end, sensillae bases  $32\mu$  apart, sensillae ca.  $150\mu$  long, with short sparse ciliations distally. Eyes 2+2, on well defined ocular shields. Legs shorter than body, I  $1125\mu$  ( $975\mu$ ), II  $900\mu$  ( $875\mu$ ), III  $900\mu$  ( $840\mu$ ), IV  $1290\mu$  ( $1050\mu$ ); tarsus I short and broad,  $225\mu$  long by  $135\mu$  high = ratio of 1.7, metatarsus I  $165\mu$  long, ratio of length of tarsus I to metatarsus I = 1.36. Palpi stout, tibia with stout apical claw and smaller accessory claw, two pectines and on external side with a stout strong spine arising near base of tarsus (Hirst does not show this in his figure, but it is present in the type, as well as in the second specimen); palpal tarsus elongate, about reaching tip of claw.

Clothing of uniform, small, 16-25 $\mu$ , fusiform, oval, pointed, finely ciliated setae; these setae gradually lengthen posteriorly and also anteriorly and laterally on the propodosoma; at the apex of propodosoma in front of tip of crista is a fringe of long slender ciliated setae; ventrally the setae are to 30 $\mu$  in length, slender and tapering with ciliations, legs and palpi without any specialized setae.

*Loc.* The type material (damaged) was from Gawler, S. Aust., March, 1927 (S.H.), (in the S. Aust. Mus. collection); a second specimen from Bordertown, South Australia, Dec., 1934 (R.V.S.)

*Remarks.* The above description is drawn up from both specimens. The measurements given in parentheses refer to the type, and are only shown when the specimens differ.

## PLATYTROMBIDIUM PRITCHARDI (Wom., 1936).

*Microtrombidium pritchardi* Womersley, 1936, J. Linn. Soc., London, Zool., 40, 109, fig. 2 a-e.

## Fig. 38 A-D.

There is little to add to my original description of this species. A paratype specimen from the same locality and date is somewhat smaller than the type. Its dimensions are: length 1.35 mm., width 0.9 mm. Leg I  $945\mu$ , II  $680\mu$ , III  $650\mu$ , IV  $900\mu$ ; tarsus I  $195\mu$  long by  $90\mu$  high, metatarsus  $135\mu$  long.

In my remarks (*loc. cit.*) it was stated that the species was close to *P. fusicomum* (Berl.), cited by Sig Thor as the genotype, and that it mainly differed in the dimensions of the front tarsi and metatarsi. For *fuscicomum* Berlese gives the tarsus as  $190\mu$  long by  $110\mu$  high and the metatarsus I as  $113\mu$  long, giving the following ratios, tarsus length : tarsus height =  $1.73$ , tarsus length : metatarsus

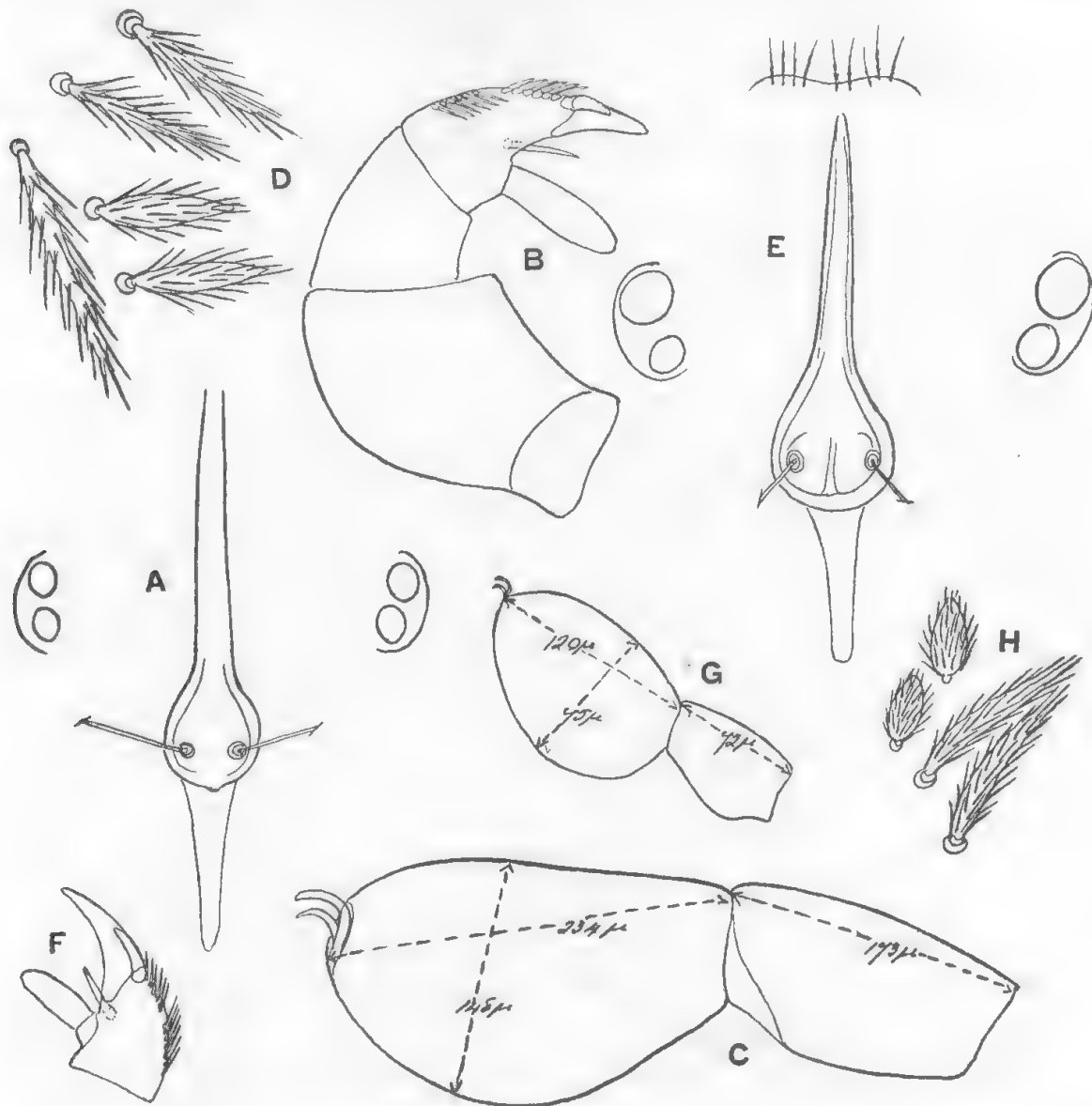


Fig. 37. A-D. *Platytrombidium paranum* (Hirst). A, Crista and eyes ( $\times 200$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 200$ ); D, dorsal setae ( $\times 860$ ). E-H. *Platytrombidium fusciforme* sp. n. E, Crista and eyes ( $\times 200$ ); F, palpal tibia ( $\times 200$ ); G, front tarsus and metatarsus ( $\times 200$ ); H, dorsal setae ( $\times 860$ ).

length =  $1.6$ . In *pritchardi* the tarsus and metatarsus are relatively longer and give the following ratios  $2.17$  ( $2.1$ ) and  $1.44$  ( $1.5$ ) respectively (the type figures in parenthesis). The ventral setae are similar in size and form to those on the dorsum.

*Loc.* Two specimens from Davis's bush, Manurewa, New Zealand, May, 1934 (E.D.P.).

## PLATYTROMBIDIUM FUSCIFORME sp. nov.

## Fig. 37 E-H.

Description. Adult. Small red species of cordate shape. Length 0.72 mm., width 0.42 mm. Legs shorter than body, I  $510\mu$ , II  $320\mu$ , III  $330\mu$ , IV  $480\mu$ ; tarsus I roughly elliptical but highest near the base,  $120\mu$  long by  $75\mu$  high, metatarsus  $72\mu$  long. Crista linear,  $150\mu$  long, with subposterior sensillary area and paired filamentous sensillae with their bases  $21\mu$  apart. Eyes relatively large,

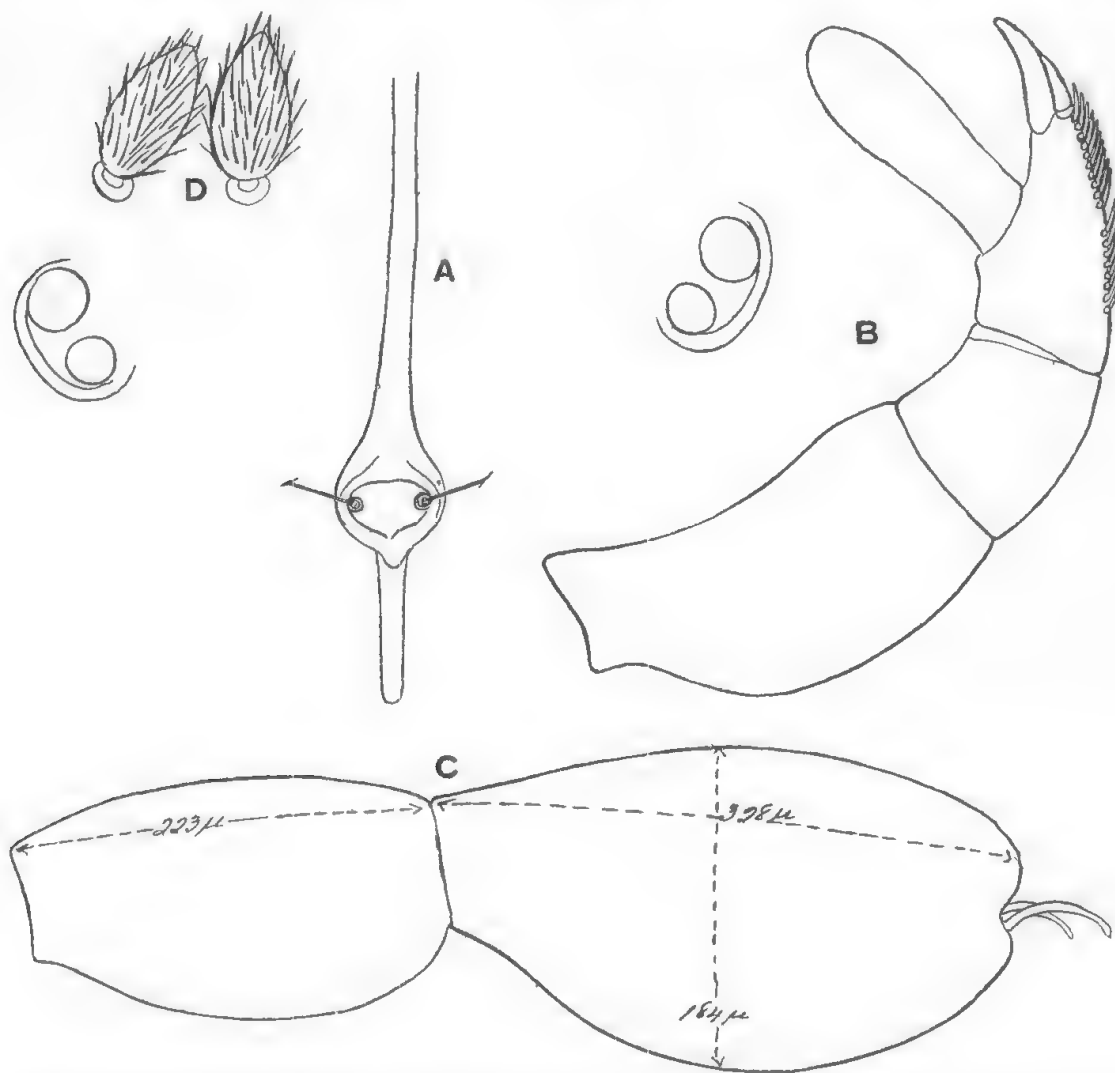


Fig. 38. *Platytrombidium pritchardi* (Wom.). A, Crista and eyes ( $\times 200$ ); B, palp ( $\times 200$ ); C, front tarsus and metatarsus ( $\times 200$ ); D, dorsal setae ( $\times 860$ ).

2+2, sessile, on distinct ocular shields. Palpal tibia stout as figured, tibia with a slender fairly stout external spine, two pectines, strong apical claw and smaller accessory claw. Inner edge of chelicerae finely serrate. Dorsal setae of two forms and sizes; on the disc short, pointed, ovate and fusiform, to  $12\mu$  with long setules, on sides and posterior end to  $20\mu$  long, fairly thick, not ovate, with long setules, these longer setae also occur about the crista and suture.

*Loc.* Nine specimens from soil, Dobodura area of New Guinea, about July, 1944 (G. M. Kohls).

*Remarks.* Easily distinguished from the other two species by the dimensions of the front tarsi and metatarsi and the dorsal setae.

## SUMMARY.

The subfamily Microtrombidiinae of the Trombidiidae, of Australia and New Guinea, is revised. The subfamily is restricted to those species in which the palpal tibiae are furnished with a strong apical claw, a smaller but stout accessory claw (absent in one species of *Dromecothrombium*), two pectines and with or without an external spine; the crista is linear with a subposterior sensillary area, but without any anterior expanded nasus-like area. Sixteen adult genera are now recognized, the characters lying in the different distinct structural groups into which the dorsal setae can be arranged, thus following the initial generic classifications of Berlese and Sig Thor. Of these 16 genera, eleven, of which five are new, are recognized from Australia, New Guinea and New Zealand. Twenty-three new species are described, one as a variety of a European species. *M. spinatum* and *M. tubbi* are sunk as synonyms. Four of Canestrini's New Guinea species *furciple*, *distinctum*, *securigerum* and *dentipile* have been rediscovered and are redescribed. *Distinctum* Canst. is shown not to be synonymous with *bipectinatum* Trägårdh from the Cameroons as stated by Berlese, 1912. The larva of a species of *Camerotrombidium* is described. The genera *Neotrombidium* Leonardi and *Calothrombium* Berl. placed by Sig Thor and others in this subfamily are removed.

The genera and species recorded are as follows:

- Dromecothrombium queenslandiae* nom. nov. for *macropodum* Wom. nec Berl. Queensland.
- Echinothrombium echidninum* (Hirst) South Australia.
- Echinothrombium willungae* (Hirst) South Australia.
- Echinothrombium bardonense* sp. nov. Queensland.
- Echinothrombium lamingtonense* sp. nov. Queensland.
- Spathulathrombium southcotti* (Wom.) gen. nov. South Australia.
- Spathulathrombium maximum* sp. nov. Tasmania.
- Spathulathrombium queenslandiae* sp. nov. Queensland.
- Spathulathrombium fulgidum* sp. nov. South Australia.
- Spathulathrombium myloriense* sp. nov. South Australia.
- Microtrombidium zelandicum* Wom. New Zealand.
- Microtrombidium maculatum* Wom. Victoria.
- Microtrombidium karriensis* Wom. South Australia, Tasmania.
- Microtrombidium hirsutum* sp. nov. S. Australia.
- Microtrombidium wellingtonense* sp. nov. Tasmania.
- Microtrombidium papuanum* sp. nov. New Guinea.
- Microtrombidium myloriense* sp. nov. South Australia.
- Microtrombidium* cf. *furciple* (Canest.) New Guinea.
- Microtrombidium aequalis* (Banks) Western Australia and South Australia.
- Microtrombidium affine* Hirst Western Australia and South Australia.
- Microtrombidium newmani* Wom. Western Australia.
- Microtrombidium adalaidicum* Wom. South Australia, New South Wales and Queensland.
- Microtrombidium jabanicum* Berl. New Guinea.
- Microtrombidium goodenoughensis* sp. nov. New Guinea.
- Microtrombidium cordatum* sp. nov. New Guinea.
- Camerotrombidium simile* (Hirst). South Australia, New South Wales (adult, and larvae).
- Camerotrombidium collinum* (Hirst) South Australia.
- Camerotrombidium wyandreae* (Hirst). Queensland.
- Camerotrombidium opulentum* sp. nov. South Australia.
- Camerotrombidium vaginatum* sp. nov. South Australia.
- Camerotrombidium carduum* sp. nov. Western Australia.
- Camerotrombidium rasum* v. *robensis* nov. South Australia.
- Camerotrombidium distinctum* (Canest.). New Guinea.

- Holcotrombidium securigerum* (Canest) gen. nov. New Guinea.  
*Holcotrombidium cygnus* (Wom.) South Australia.  
*Holcotrombidium scalaris* (Wom.) New Zealand.  
*Holcotrombidium dentipile* (Canest.) Ceylon.  
*Laminothrombium myrmicum* (Wom.) South Australia.  
*Foliotrombidium evansi* (Wom.) gen. nov. Tasmania.  
*Foliotrombidium bisetosum* sp. nov. Victoria, Queensland.  
*Foliotrombidium ornatum* sp. nov. South Australia.  
*Foliotrombidium kohlsi* sp. nov. New Guinea.  
*Hiotrombidium tubbi* (Wom.) gen. nov. Victoria.  
*Hiotrombidium healslipi* (Wom.) Queensland.  
*Hiotrombidium koordanum* (Hirst). Western Australia.  
*Hiotrombidium canberraense* sp. n. Australian Capital Territory.  
*Pedotrombidium kohlsi* gen. et sp. nov. New Guinea.  
*Platytrombidium paranum* (Hirst) South Australia.  
*Platytrombidium pritchardi* (Wom.) New Zealand.  
*Platytrombidium fusciforme* sp. n. New Guinea.